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ABSTRACT

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A METHODOLOGICAL INVESTIGATION OF THE DEVELOPMENT OF A SEMANTIC DIFFERENTIAL TO ASSESS SELF-CONCEPT

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This study developed a semantic differential (SD) instrument to measure self-concept that was not influenced by social desirability. An alpha factor analysis of 53 SD scales produced five interpretable factors for the females and five interpretable factors for the males. A subsequent investigation of the convergent validity of each of the factors resulted in the confirmation of only the Evaluation and Potency factors for males and the Evaluation, Activity, and "Intellectual Ability" factors for females as valid measures of self-concept. The Evaluation dimension for females and the Potency dimension for males could be influenced by the social desirability factor; however, the extent of this influence upon the dimensions was not of sufficient magnitude to render them invalid measures of self-concept.

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INTRODUCTION

Self-Concept

Basically, two theoretical approaches to self-concept exist (Wylie, 1961). One group of theorists believes that one cannot understand and predict human behavior without knowledge of a person's conscious perceptions of his environment. These theorists have been labeled phenomenological because conscious perceptions, cognitions, and feelings play a central role in the development of their theories. The second theoretical approach is nonphenomenological. Researchers who are proponents of this approach attempt to measure unconscious aspects of self-concept and other nonphenomenological variables which they believe to be pertinent to self theories. The above two theoretical approaches to self-concept are in many ways ambiguous, incomplete, and overlapping as well as not being exhaustive of the many specific theoretical approaches to self-concept (Wylie, 1961).

Self-concept as a construct has received considerable attention in the research of the past few decades. Researchers have investigated the development of self-concept, the variables that influence it, and how it relates to behavior. Studies that have dealt with parent-child interaction, social interaction, body characteristics, counseling and psycho-therapy, experimentally induced success and failure, and learning were each investigating self-concept as the consequence of one or more of the above influences. Studies of behaviors that were presumed to de-

pend upon self-concept have been initiated in the following areas: Performance in learning tasks, self-regard and adjustment, self-acceptance and acceptance of others, self-regard and ethnocentrism or authoritarianism, and self-regard and level-of-aspiration behavior. The reader is referred to Wylie (1961) and Thompson (1972) for reference to the many studies that have investigated the relationship between self-concept and the behavior variables mentioned in this section.

The total research effort in the area of self-concept was summarized quite eloquently by Wylie (1961):

> On the whole, we have found that there are enough positive trends to be tantalizing. On the other hand, there is a good deal of ambiguity in the results, considerable apparent contradictions among the findings of various studies, and a tendency for different methods to produce different results. In short, the total accumulation of substantive findings is disappointing, especially in proportion to the great amount of effort which obviously has been expended (p. 317).

One of the changes in research procedure suggested by Wylie (1961) which, if carried out, might lead to more definitive outcomes in self-concept research is the development of limited and well analyzed measuring instruments. Wylie (1961) in her survey of self-concept research literature found that a wide range of instruments had been used to measure self-concept. The majority of instruments used were either Q sorts, rating scales, questionnaires, or adjective check lists. Wylie was highly critical of the many instruments because they were not developed with adherence to instrument development procedures.

Problems in Measuring Self-Concept with a Semantic Differential

Although the original purpose of the semantic differential (SD) was to measure the connotative meaning of given concepts (Osgood, Suci,

& Tannenbaum, 1957), the SD technique, having been found to consistently produce a strong evaluative factor, has been used in a variety of ways in the field of attitude measurement (Brinton, 1967). One way in which the SD technique has been applied frequently is in the measurement of a person's attitude toward himself.

The application of the SD technique to the measurement of self-concept has not occurred without the development of methodological and theoretical-psychological issues.

Methodological issue: dimensionality. At present an instrument in SD format specifically developed for the measurement of self-concept, that possesses a reasonable degree of reliability and validity, does not exist. Consequently, researchers attempting to measure self-concept using the SD technique have been confronted with the task of instrument development. One problem in the development of an SD instrument is the dilemma caused by the question of which dimension or dimensions (Evaluation-E, Potency-P, Activity-A) should be represented on the instrument. Osgood et al., (1957) proposed that in measuring attitudes, just the Evaluation dimension of the SD need be considered. The justification for this suggestion was simply that it seemed reasonable in light of previous writings on attitudes. Heise (in Summers, 1970) concluded that what we mean by attitude is simply the affective reaction to an object, and this reaction frequently is along a dimension which is a compound of EPA. The single dimension represented in the traditional attitude scales corresponds to the salient attribute for the attitude object, and this is not always pure Evaluation: it may include any combination of the SD

dimensions. Thus, studies employing the SD for attitude measurements should make use of all three dimensions to obtain measurements paralleling those measurements obtained from traditional attitude scales. Kubiniec's (1971) position on the dimensions that should be represented is flexible: include those dimensions that are considered necessary for an adequate assessment of self-concept. In using the SD technique to assess self-concept the interest is not only in assessing the dimensionality of the meaning space; rather it may be in measuring individual differences in self-concept. The concepts employed are specifically selected to assess aspects of self-concept, and the scales serve as descriptive adjectives that subjects employ to describe and/or rate themselves. Therefore, it could be argued that only evaluative scales should be employed since implicit in measuring the self-concept is the notion that the individual is evaluating himself. On the other hand, one could argue that an adequate assessment of an individual's concept of himself would include his description of himself as well as his evaluation of himself. This argument suggests use of all three dimensions with evaluative scales reflecting self-evaluation and potency and activity scales reflecting self-description (Kubiniec, 1971).

The absence of empirical evidence and the lack of agreement among theorists have caused a state of uncertainty with respect to the dimensionality problem. A survey of the literature confirms the dimensionality dilemma. Solly and Stagner (1956), Dyer (1963), Schwartz and Tangri (1965), and Nisbett and Gordon (1967) obtained a measurement of self-concept using an SD instrument with only the Evaluation dimension represented, whereas Lazowick (1955), Grigg (1959), Smith (1960), Aiken

.(1965), Pervin and Lilly (1967), Kubiniec (1970), and Farr and Kubiniec (1972) obtained a measurement of self-concept using an SD instrument with the Evaluation, Potency, and Activity dimensions represented. No studies have investigated the differences produced in the measurement of self-concept between an SD instrument having only the Evaluation dimension represented and an SD instrument having the Evaluation, Potency, and Activity dimensions represented.

The validity of the measurement of the self-concept with the SD instruments employed in each of the studies mentioned in the preceding paragraph is questionable. Several researchers (Coyne & Holzman, 1966; Heise, 1969; Kubiniec, 1970) have indicated that the existence or possible existence of concept-scale interaction means that an SD should be validated and adjusted for every new group of selected stimuli with which it is used. Heise (1969) described two conditions that could give rise to concept-scale interaction:

> Concept-scale interaction can arise because a scale has different degrees of relevance for different concepts. For example, sweet-sour may be highly relevant in evaluating food, moderately relevant in evaluating people, and of low relevance in evaluating abstract ideas. The amount of meaningful variation in ratings is proportional to relevance and, in practice, therefore, there would be little meaningful variation in sweet-sour ratings of abstract ideas. Thus, in rating this class of concepts, the sweet-sour scale would show little relation to any other scale and could not have its customary high loading on Evaluation. Relevance thus produces concept-scale interaction in the following sense. If a scale is irrelevant to a concept or to a class of concepts, ratings on it may have low communality with other scale ratings so the scale drops out of its usual factor location -- it measures nothing.
>
> Concept-scale interaction also can arise due to semantic shifts in the scale adjectives which develop because of the environment provided by the concept (p. 418).

In those studies previously mentioned that applied the SD technique to the measurement of self-concept, the defining scales of the dimensions were chosen without controlling for concept-scale interaction. The classification of a scale as being representative of either the Evaluation, Potency, or Activity dimension was based on previous classifications found in the research literature where the purpose of the investigation was to define the basic dimensions of meaning of the concept being rated. The concepts being rated were not necessarily from the class of self-concept stimuli.

In order to control for concept-scale interaction and to obtain precise measurements in content domains different from the domain which originally defined the EPA scales, factor analytic procedures should be followed to develop instruments containing specially selected scales. A procedure suggested by Heise (1969) for extending the SD technique to a new content domain is to have a sample of subjects use selected scales to rate concepts from the content area: then the data are factor analyzed to determine the underlying dimensions and factor loadings of each scale on each dimension.

Theoretical-psychological issue: social desirability. Crowne and Marlowe (1960) define social desirability as the need of a subject to obtain approval by responding in a culturally appropriate and acceptable manner. There is a unique aspect to this issue when assessing self-concept with a self-report instrument. The question may be asked whether a subject who selects socially desirable responses as characteristic of himself does so because they are socially desirable or because he honestly perceives himself as possessing these characteristics. The

theoretical relationship between social desirability and self-concept is not clear. Wylie (1961) indicated there is no procedure to determine in what cases and under what circumstances the social desirability variable invalidates an individual's self-report from reflecting his phenomenal field.

Several studies (Cowen & Tongas, 1959; Crowne & Stephans, 1961; Pervin & Lilly, 1967) concluded that the social desirability factor can influence the measurement of self-concept when self-evaluative techniques are used as the measuring device. Ford and Meisels (1965) have shown that the social desirability of SD scales corresponds directly to their loading on the Evaluation dimension. Pervin and Lilly (1967) have suggested that particular attention should be given to the social desirability factor when self-evaluative ratings are made on evaluative-type adjectives on an SD instrument. Both studies (Pervin et al., 1967; Ford et al., 1965) found the Potency and Activity dimensions to be unrelated to social desirability.

The results of two studies (Ford et al., 1965; Nickols & Shaw, 1964) have suggested that direct SD ratings of concepts may not be an efficient approach to measurement when salient or delicate topics are involved because subjects can distort their responses in a socially desirable direction. One of the comments offered by Heise (1969) concerning the suggestions resulting from the research findings of Ford et al. (1965) and Nickols et al. (1964) is that the validity of their suggestions could have been strengthened if the social desirability factor had been a control variable in the studies.

Statement of Problem

The application of the SD technique to the measurement of self-concept has produced a multitude of SD instruments, each purporting to measure self-concept. Estimates of the reliability and validity of each of these instruments are limited to those obtained in the investigations for which they were initially developed. The type of validity reported was generally face validity and the only type of reliability reported was internal consistency. In addition to the absence of further proof that the SD instruments were valid and reliable, questions emanating from the developmental procedures used to construct the instrument have arisen. The lack of agreement by researchers on which SD dimensions to include on an instrument, their failure to consider the phenomenon of concept-scale interaction, and the insufficiency of understanding of the relationship between social desirability and self-concept necessitates methodologists to initiate research on the development of an SD instrument to measure self-concept.

Statement of Purpose

The purpose of this study was to develop an SD instrument to measure self-concept that would not be influenced by social desirability. The process used to develop the instrument attended to the following areas of concern:

1. A confirmation of the EPA factor structure
2. The validation of the EPA dimensions as measures of self-concept
3. An investigation of the extent to which the social desirability factor influenced the EPA dimensions

METHODOLOGY

Statement of Research Hypotheses

The confirmation of the EPA factor structure underlying the measurement of self-concept through an SD technique did not necessitate the formulation and testing of hypotheses. The validation of the EPA dimensions as measures of self-concept and the investigation of the extent to which the social desirability factor influenced the EPA dimensions resulted in the formulation and testing of six hypotheses. Hypotheses I, II, and III were concerned with the validation of the EPA dimensions as measures of self-concept. Hypotheses IV, V and VI were concerned with the extent to which the social desirability factor influenced the EPA dimensions. The hypotheses were:

I. There is a significant multiple correlation between the Evaluative factor and a set of criterion measures of self-concept.

II. There is a significant multiple correlation between the Potency factor and a set of criterion measures of self-concept.

III. There is a significant multiple correlation between the Activity factor and a set of criterion measures of self-concept.

IV. When the effect of social desirability has been statisti-

cally removed from the Evaluation factor and a set of criterion measures of self-concept, there is a significant multiple correlation between the Evaluative factor and a set of criterion measures of self-concept.

V. When the effect of social desirability has been statistically removed from the Potency factor and a set of criterion measures of self-concept, there is a significant multiple correlation between the Potency factor and a set of criterion measures of self-concept.

VI. When the effect of social desirability has been statistically removed from the Activity factor and a set of criterion measures of self-concept, there is a significant multiple correlation between the Activity factor and a set of criterion measures of self-concept.

The set of criterion measures of self-concept referred to in the six research hypotheses consisted of the following instruments: The Adjective Check List (Gough et al., 1965), the Tennessee Self-Concept Scale (Fitts, 1965), The Index of Adjustment and Values (Bills et al., 1951), and The Piers-Harris Children's Self-Concept Scale (Piers, 1969). The employment of a set of criterion measures of self-concept instead of a single self-concept measure was decided upon because of the absence of a single instrument which measures all of the dimensions of self-concept. Past research efforts have demonstrated the reliability and validity of each of the above instruments as measures of self-concept, but no empirical evidence has been obtained to demonstrate whether the instruments were measuring the same or different dimensions of self-concept. One of

the purposes of this study was to validate the EPA dimensions as measures of self-concept. The validation of the EPA dimensions as measures of self-concept was dependent upon the dimensions that were measured by the criterion measure of self-concept. Consequently, the criterion measure of self-concept had to include as many dimensions of self-concept as possible.

Population and Sample

The population in this study was tenth grade high school students. Consequently, the results and conclusions of this study should not be assumed for any other age group because of possible differences in the "life space" of individuals at different age levels. The sample consisted of 208 tenth-grade students in a local high school. The tenth grade was selected because it represents an age common to all the standardization populations of the selected set of criterion measures of self-concept. A sample size of between 200 and 250 individuals was decided upon based on the following considerations:

1. Stability of statistical results
2. Statistical requirements of factor analysis with respect to the number of subjects
3. Economics
4. Availability of subjects
5. Minimizing the disruptions to classroom routine caused by the testing schedule.

A random selection of individuals was not feasible. Thus to obtain the desired sample size a random selection of ten intact classrooms

out of a possible fourteen was performed. This random selection of classrooms resulted in a sample size of 240 from which complete data were obtained for 208 students. The final sample consisted of 100 males and 108 females.

The data for testing the research hypotheses were obtained by administering an instrument in SD format measuring the concept "ME AS I REALLY AM" with fifty-three bipolar adjective scales. Also a social desirability scale and a set of four instruments measuring self-concept were administered to the sample of 208 sophomores. The Adjective Check List (Gough, et al., 1965), The Tennessee Self-Concept (Fitts, 1965), The Index of Adjustment and Values (Bills et al., 1951), and The Piers-Harris Children's Self-Concept Scale (Piers, 1969) were the instruments employed to measure self-concept.

Description of Instruments Administered

The four instruments that composed the set of criterion measures of self-concept were selected using the following criteria:

1. The instrument purportedly measures the general self-concept.
2. The reliability of the instrument has been demonstrated.
3. The validity of the instrument has been investigated.
4. The instrument has been shown to be useful in more than one context in the literature.

Instruments. The Index of Adjustment and Values (IAV) consists of forty-nine words which occur frequently in client-centered interviews and which seem to present clear examples of self-concept definitions (Robinson & Shaver, 1969). Subjects use each of these words in the fol-

lowing sentence: "I am a (an) _____ person" and then indicate on a five-point scale how much of the time this statement describes them. Summing their responses to the forty-nine words yields a measure of self-concept. An internal factor analysis of the forty-nine words by Bills (Wylie, in press) resulting in one general evaluative factor accounting for most of the variance, validated Bills' procedure of summing across disparate items to obtain a total self-concept score. The IAV will also yield a measure of self-acceptance and ideal self-concept. Only the self-concept scale was used in this study. The instrument has been administered to thousands of high school and college students, as well as to various non-student groups. Various reliability and validity values have been obtained which have been collected and organized in an undated mimeographed manuscript by the senior author (Bills, no date).

Wylie (late 1973) found studies reporting corrected split-half reliabilities for the self-concept scale ranging from .53 for 100 college students to .92 for 155 factory workers: test-retest coefficients ranged from .90 over a six-week interval for 160 college students to .81 over a six-month interval for 35 college males. Evidence for convergent validity is demonstrated by moderate correlations ranging from .36 to .60 with many different purported measures of self-concept.

Wylie in a forthcoming book (Late 1973) evaluated the reliability and validity of the IAV as follows:

> It is evident that the IAV has been used by many researchers. Reliability is quite high. Evidence for convergent validity includes correlations with many different purported measures of self-regard---a wider range of such instruments than is the case for any other self-regard measure. Although the degree of convergent validity of any of the self-regard scores from the IAV is quite moderate, it is prob-

> ably as good as that for any extant instrument which purports to measure "global" self-regard with the use of numerous items... (p. 253).
>
> Discriminant validity among the IAV self-regard scores and between any one IAV self-regard score and other conceptually distinguishable variables remains undemonstrated because multitrait-multimethod techniques have not been applied. Such evidence as is available suggests that discriminant validity of both kinds is lacking (p. 253).

The Tennessee Self-Concept Scale (TSCS), another scale which purports to measure self-concept, is simple for the subject to take, widely applicable, well standardized, and multidimensional in its description of self-concept. The scale consists of one hundred self-descriptive statements which the subject uses to portray his own picture of himself. The scale is self-administered and can be used with subjects age twelve or older having at least a sixth-grade reading level. It is also applicable for all people regardless of psychological adjustment. The scale produces a variety of indices, but this study was concerned only with the Total P score.

The respondent answers each of the one hundred statements on the TSCS on a five-point scale judging the truth or falsity of the statement as it describes himself. A total self-concept score (Total P) is obtained by summing across all items: of the one hundred items on the TSCS, ninety items are used in the computation of the Total P score. Forty-five of the items are positive in content and forty-five are negative. In scoring, the negative items are reversed, those marked one are given a value of five and these are added to the positive score to yield the Total P score. The Total P score "reflects the overall level of self-esteem."

The TSCS manual (Fitts, 1965) provides norms based on a sample of 626 subjects. The subjects included high school and college students. The test-retest reliability coefficient for the total self-concept score of the TSCS, given to sixty college students over a two-week period, was .91. The reliability coefficients for the other nine indices ranged from .80 to .92. Validation procedures for the scale have produced four types of validity: content, discriminant, convergent, and predictive. Thus the validity data support the TSCS as a measure of self-concept (Fitts, 1965).

The Piers-Harris Children's Self-Concept Scale (PH) is a self-report instrument designed for children from the ages of eight to fifteen. The scale was designed primarily for research on the development of children's self-attitudes and correlates of these attitudes. The instrument contains eighty items reflecting high or low perceptions of the self. The content of the items was formulated from Jersild's (1952) research on what people say they like and dislike about themselves. The items are scored in the direction of high self-concept. Norms based on school children, grades four through twelve, are available. The internal consistency of the test has ranged from .78 to .93. Test-retest reliability coefficients over a two-month and four-month interval were both reported as being .77 for 244 fifth graders. Stanwyck and Felker (1971) and others cited in the manual (Piers, 1969) lend support to the contention that the scale possesses validity.

The Adjective Check List (ACL) is a list of three hundred adjectives that are possible descriptors of one's self. Twenty-four indices have been developed which can be scored from one administration of the

ACL. This study used only one of the indices: self-confidence. This index consists of twenty-eight adjectives "indicative" of self-confidence and twelve adjectives "contraindicative" of self-confidence. A person's score is determined by subtracting the number of contraindicative from indicative adjectives checked and then converting to a standard score according to sex and total number of adjectives checked. The test-retest coefficients for the self-confidence scale range from .63 to .73. The ACL indices have indicated considerable construct validity in a wide variety of studies (Gough et al., 1965). Acquiescence is controlled to a large extent by assigning standard scores after taking "total number checked" into account. Correlations between the Edwards Social Desirability Scale and the various ACL indices have been generally lower than for other self-description instruments (Robinson et al., 1969).

Interpretation of the self-confidence scale is described in the manual (Gough et al., 1971) as follows:

> The high-scorer is assertive, affiliative, outgoing, persistent, an actionist. He wants to get things done, and is impatient with people or things standing in his way. He is concerned about creating a good impression, and is not above cutting a few corners to achieve this objective. He makes a distinct impression on others who see him as forceful, self-confident, determined, ambitious, and opportunistic. The low-scoring person is a much less effective person in the everyday sense of the word--he has difficulty in mobilizing himself and taking action, preferring inaction and contemplation. Others see him as unassuming, forgetful, mild, preoccupied, reserved, and retiring. (p. 8).

The Marlowe-Crowne Social Desirability Scale (SDS) is a scale which attempts to identify the degree to which an individual describes himself in a socially desirably light in order to achieve approval of others. The items in the scale are modelled to achieve a balance of two types of statements: some culturally acceptable but probably untrue,

the others possibly true, but undesirable. The scale consists of thirty-one true-false items about self. Items one and twenty-seven were omitted because they were inappropriate for the sample. One point is scored for each response in the socially desirable direction with scores therefore varying between zero (no social desirability) and thirty-one (highest social desirability) (Crowne et al., 1960). Some norms are available and the internal consistency (Kuder-Richardson 20) of the scale is reported to be .88. A test-retest correlation over a one-month interval with fifty-seven college students also was .88. The authors claim validity by the confirmation of several hypotheses in experimental settings. A comprehensive review of the scale is provided by Wiggins (1968, pp. 305-308).

An instrument in SD format was constructed by the investigator and administered to the sample. The purpose of the instrument was to obtain a rough measure of self-concept by having the subjects respond to the concept "ME AS I REALLY AM" on fifty-three bipolar-adjective scales. Each scale has seven defining positions as suggested by Miller (1956) and is scored from +1 to +7 with +4 being the neutral category. Each scale position is labeled with an adverb as suggested by the results of a study by Wells and Smith (1960). They found that the amount of differentiation in SD ratings was substantially greater when adverbial labels were used to define the scale positions. No adverbial labels led to many more ratings at the end-points of the scales. The adverbial quantifiers used to define the scale position were "extremely," "quite," and "slightly." Cliff (1959) investigated the metric characteristics of adverbial

quantifiers, and he concluded that the above adverbs define rating positions which are about equidistantly spaced.

The fifty-three bipolar-adjective scales were selected from several SD instruments purporting to measure self-concept (Aiken, 1965; Farr et al., 1972; Grigg, 1959; Kubiniec, 1970; Lazowick, 1955; Nisbett et al., 1965). A list of the fifty-three bipolar-adjective scales can be found in Appendix A. The arrangement of the fifty-three SD scales as well as the polarity of each scale on the instrument was determined through a randomization procedure to prevent subjects from developing response sets which could reduce the sensitivity of the measurement (Heise in Summers, 1970). The results of research conducted by Kane (1971) supplied no evidence that users of an SD need to be concerned about item order effects as a significant source of error variance. Consequently, the order of presentation of each of the scales was identical for each subject.

Testing Procedures

The fifty-three SD scales, the Marlowe-Crowne SDS, and the set of criterion measures of self-concept were administered to ten intact classes of high school sophomores (N=208). The testing schedule included three testing sessions with a one-week time lapse between sessions. The one-week time lapse between testing sessions and the randomization of the order of the administration of each of the six instruments within a class were employed to minimize transfer from instrument to instrument and any order of presentation effect, respectively.

Taylor (1953) using a Q-sort found the self-concept to be relatively stable over time intervals up to approximately seven and one-half months and usually not significantly altered by changes in the external environment. The possibility of changes in a subject's self-concept during the three-week testing period was considered, but based on Taylor's (1953) findings, the transfer from instrument to instrument posed a more serious threat to validity than did possible alterations in the self-concept. Thus, the decision to space the testing sessions over a three-week period was made. The complete testing schedule is presented in Table 1. The instructions given the subjects and the scoring of the TSCS, ACL, IAV, PH, and SDS were those given in the manuals of each of the instruments. The subjects were instructed to respond to the fifty-three bipolar-adjective scales in a manner similar to that suggested by Osgood et al. (1957, pp. 82-83); the scoring of each of the SD scales was previously explained in this chapter. Oral instructions identical to the written instructions were administered for each instrument. Additionally, any subject who did not fully understand the instructions was given individual assistance in solving his difficulties with the response mode. Each subject was assured that his anonymity would be maintained.

Statistical Analysis of Data

Statistical analyses used in the confirmation of the EPA factor structure. Initially, Pearson product-moment correlations were computed for all possible pairwise combinations of the fifty-three SD scales. The resulting correlation matrix was then factor analyzed using alpha factor analysis (Kaiser & Caffrey, 1965). Guttman's (1956) greatest lower bound

TABLE 1

Testing Schedule of the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH), the Fifty-Three SD Scales, and the Marlowe-Crowne SDS

Class	Testing Session 1	2	3
1	PH TSCS	IAV SDS	SD ACL
2	TSCS SDS	IAV SD	ACL PH
3	PH IAV	SD TSCS	ACL SDS
4	ACL SDS	IAV SD	TSCS PH
5	SD TSCS	PH SDS	IAV ACL
6	ACL SDS	IAV PH	TSCS SD
7	IAV TSCS	ACL SDS	SD PH
8	IAV SD	TSCS PH	SDS ACL
9	SD TSCS	IAV PH	ACL SDS
10	IAV PH	ACL SD	TSCS SDS

for the initial communality estimate was used, and the final communalities were determined by an iterative procedure developed by Kaiser and Caffrey (1965, pp. 12-13).

The decision to use a factor analytic method that analyzes only common variance instead of total variance was based on the following discussion by Weiss (1971):

> Principal components analysis (a principal axis solution of a correlation matrix with 1.0 in the diagonal) is the only method of factor analysis which analyzes the total variance of each variable. Since the variables submitted to principal components analysis sometimes have low reliabilities (and therefore low common variance), analyses of these kinds of variables may lead to principal components matrices in which some of the factors represent correlated error variance. These factors would be unlikely to replicate in another sample of individuals measured on the same variables and, therefore, might lead the researcher to draw unwarranted conclusions about the structure of his variables. With the exclusion of the method of principal components, most factor-analytic methods are concerned only with common variance, which is that portion of the reliable variance of a variable which correlates with other variables in the matrix. Because common variance is a subset of reliable variance, factor analysis of common variance should lead to the identification of factors most likely to be stable from one sample to another (pp. 85-86).

More specifically, the decision to employ alpha factor analysis from several available factor analytic methods that only analyze common variance was based on the type of inference (psychometric or statistical) most appropriate to this study. Kaiser and Caffrey (1965) distinguished between the two types of inference:

> To distinguish these two types of inference, consider a rectangular matrix of observable scores of "N" individuals on "n" variables. Traditional statistical inference views the "N" individuals as a (usually random) sample from some larger population and attempts to make inferences about this population from the characteristics of the sample. On the other hand, what might be termed psychometric inference considers the "n" variables as a (usually nonrandom) selection from some larger universe of variables and attempts to infer something about the nature of this universe from a study of the particular selection of "n" variables (p. 1).

Thus, the purpose of this factor analysis was not to discover the factor structure for the sample of 208 subjects. Rather, the point of investigation was on generalizing to a universe of SD scales from a sample of scales. In other words, the dimensions which emerge must be useful for generalizing to a universe of all possible SD scales which might be used to measure self-concept.

The criterion for retaining factors before rotation was to retain only those factors that had positive generalizability (all eigenroots $\geq$ 1.00). The factors satisfying the above criterion were then rotated using Kaiser's (1958) normal varimax method to approximate simple structure. Smith (1962) concluded in his study of comparisons of rotated factor analytic solutions of self-concept data that Kaiser's normal varimax method of rotation provided the most satisfactory factor structure for interpretation. Prior to rotation the generalizability coefficient of each factor was computed. Cronbach's (1951) generalizability coefficient sets an upper limit to the reliability of a factor appearing across factor analyses of a given battery of tests or scales. The higher the generalizability coefficient, the greater the confidence one would have that the factor would appear under varied conditions and under a variety of circumstances. Cronbach, Rajaratnam, and Gleser (1963) proposed that the generalizability coefficient could also indicate how validly one can interpret a resulting factor as being representative of a given battery of tests or a set of scales.

> The coefficient of generalizability is for most purposes an adequate indicator of the homogeneity of the universe. A small coefficient implies that one could hope for appreciably closer relation between observation and interpretation if he narrowed or redefined the uni-

verse of generalization. Thus, the coefficient helps to estimate the potential value of the proposed universe as a construct (p. 159).

Only those factors that had a generalizability coefficient .700 and had at least two scales loading significantly on the factor after rotation were interpreted. Parker (1970) developed a subroutine to estimate the critical value of factor loadings based on a statistically based estimate made available in Harman (1967, p. 435) and Holzinger and Harman (1941, p. 131). The procedure is to calculate the standard error of the factor loadings and multiply this value by three. The resulting value represents the minimum magnitude a factor loading need attain to be considered significantly different from zero at the .01 level. Holzinger et al. (1941) defended why the standard error should be multiplied by 3.00 instead of 2.58:

> ... if a particular residual is just twice its standard error (as given by one of the approximate formulas) it can safely be said that this residual is probably insignificantly different from zero. The argument is that the S.E. is probably a little larger, and the ratio a little less, than two. For such investigation, then, the level of significance should be taken at least 3 times the standard error (p. 131).

The above described procedure was utilized to determine which scales were the defining scales of a factor.

The resulting factor structure of the factor analysis of the fifty-three SD scales indicated that the Potency factor was correlated with the masculine-feminine scale. Other authors (Kubiniec, 1970; Farr & Kubiniec, 1972) analyzed their data by sex. These two points suggested that the underlying dimensions of self-concept as measured by the SD technique were different for males and females. In addition to the above two indicants of a possible sex difference, the sex of an individ-

ual was added as the fifty-fourth variable to the fifty-three SD scales. The fifty-four variables were intercorrelated and factor analyzed (alpha). The same factor structure emerged as was previously obtained using only the fifty-three SD scales, except that the sex variable was the largest loading variable (.711) on the Potency factor. As a result of the above evidence for the occurrence of sex differences, the sample was separated by sex, Pearson product-moment correlations were computed for all possible pairwise combinations of the fifty-three SD scales for males and females separately, and each resulting intercorrelation matrix was factor analyzed producing two separate factor structures. From this point on identical analyses were performed for both the females and males.

Each retained factor was identified and factor scores were estimated from the observed scores on each individual for all retained factors. The Thurstone (1935) least-square estimation method was applied in computing the factor scores. The decision to use the Thurstone least-square estimation procedure was based on the results of a study by Frankiewicz (1970). He investigated the selection of a combination of factor analytic solutions and factor score estimation methods which would produce the most robust measure of factor scores when several nonnormal distributions of attitude scores were considered. He was concerned with nonnormal distributions because the truncated Gaussian distribution is often the nonnormal form found for attitude or personality item scores. He found that the factor score estimation method of Thurstone, when used in combination with alpha factor analysis on a truncated Gaussian distribution, was the most robust of the 25 factor analytic factor score estimation combinations studied. Mulaik's (1972) comment that the Thurstone

method of estimation is as good as any other method even when the distribution of the attribute of interest is not considered lends additional strength to the decision to use Thurstone's least-square estimation method.

Statistical analysis used in the validation of the EPA dimensions as measures of self-concept. The standard method of establishing convergent validity is to correlate the instrument under investigation with other instruments that purportedly measure the same variable or trait (Campbell & Fiske, 1959). Hypotheses I, II, and III were tested by computing the multiple correlations between the retained factors and the four criterion measures of self-concept.

Statistical analyses used in the investigation of the extent to which the social desirability factor influenced the EPA dimensions. Research Hypotheses IV, V, and VI were formulated in an attempt to provide an operational means to investigate possible solutions to the question of to what extent the resultant dimensions produced by the factor analysis of the fifty-three SD scales could be influenced by a social desirability factor. The Marlowe-Crowne SDS was used to measure social desirability.

Previously, in the investigation of Research Hypotheses I, II, and III, the fifty-three SD scales were factor analyzed for both males and females separately; and factor scores were computed for each individual for each of the retained factors. Subsequently, each of these factors was correlated with the four criterion measures of self-concept in an attempt to validate the factors as measures of self-concept.

To investigate whether or not a social desirability factor could influence any or all of the retained factors, each of the factors was

correlated with a measure of social desirability. Any resulting significant correlations would indicate that social desirability may have influenced the measurement of self-concept. Cause and effect implications can not be determined through this investigation, since it is essentially correlational, although any degree of correlational relationship found here would suggest that a cause and effect relationship may be determined if the experimental variables were manipulated. Once it was determined which dimensions may have been influenced by a social desirability factor, the question of the extent of this potential influence was ascertained. A multiple partial correlational technique (Cooley & Lohnes, 1971) was employed: after the effect of the social desirability factor was removed from both the set of criterion measures of self-concept and a retained self-concept factor, the multiple correlation between the residualized set of criterion measures of self-concept and the residualized self-concept factor was tested for significance.

The development of a multidimensional SD instrument containing specially selected scales to measure self-concept. As previously mentioned in Chapter I several researchers have indicated that the existence or possible existence of concept-scale interaction, whether it is a function of relevance or stimulus environment, means that an SD should be validated and adjusted for every new stimulus class with which it is used. A generalized SD, using the standard EPA scales previously classified by Osgood, can be used as a rough measurement, but more precise measurements will be attained only by tailoring instruments to each concept domain so as to control for concept-scale interactions. Thus, in the present study, an attempt was made to develop an SD instrument whose spe-

cific purpose is to measure self-concept. The refined SD instrument developed in this study contains specially selected scales whose underlying dimensions and factor loadings were determined by having subjects respond to a selected stimulus from a list of self-concept stimuli culled from the literature. This SD instrument specifically tailored for the measurement of self-concept was developed based upon the conclusions derived from the results of the analyses that were conducted as described in the previous two sections.

The initial procedure in the development of the refined SD instrument was to determine which scales should be used to define the factors found to correlate significantly with the set of criterion measures of self-concept. The complete set of scales that defined the self-concept factors resulting from the factor analysis was not used for the following reasons:

1. Generally, an unweighted procedure is employed to obtain a self-concept score because of the difficulty of obtaining a differentially weighted score.
2. If an unweighted procedure is utilized, then the orthogonality of the factors is no longer preserved.
3. The defining scales of the self-concept factors were obtained without any consideration of the social desirability factor.

As can be ascertained from the above, it was desired that the SD self-concept factors, each represented by an unweighted factor score, not correlate significantly with one another or with the measure of social desirability. To obtain factors possessing the aforementioned properties, the defining scales of the retained factors were correlated with the weighted

factor scores. Any scale that correlated significantly with the measure of social desirability or a weighted factor score of which it was not a defining scale, was rejected as a scale to be used in the computation of the unweighted factor score. A simple procedure suggested by Heise (in Summers, 1970) for calculating unweighted factor scores was used: simply determine the mean rating over all those scales on a factor and let this mean represent the unweighted factor score. Heise (in Summers, 1970) does caution that this procedure assumes that the original factor loadings of the defining scales for a given factor were all high, comparable in size, and loaded mainly on one factor; only if these assumptions are seriously violated is it necessary to resort to a more complicated process involving a differential weighting procedure to produce factor scores.

The final step was to determine if each of the self-concept dimensions, represented now by the unweighted factor scores, correlated significantly with the set of criterion measures of self-concept; a multiple correlation approach was used. Additionally, coefficient alpha (Cronbach, 1951) which is an estimate of the internal consistency reliability was obtained for each of the self-concept factors.

RESULTS

Psychometric Data Related to the Set of Criterion Measures of Self-Concept and the Fifty-three SD Scales

Tables 2 and 3 provide the means and standard deviations for the TSCS, ACL, PH, IAV, Marlowe-Crowne SDS, and the fifty-three SD scales, respectively. The obtained means and standard deviations for the TSCS, PH, and SDS are comparable to those means and standard deviations in the manuals for those studies using tenth grade subjects. Table 4 shows the coefficient alpha estimate of the internal consistency reliability of the TSCS (Total P score), ACL (Self-Confidence score), IAV (Self-Concept score), PH, and SDS. Studies previously cited in Chapter III found internal consistency reliability estimates for the IAV to range from .78 to .93, the SDS to range from .75 to .88, and the PH to range from .78 to .93. Where comparisons are possible the estimates of internal consistency reliability of this study are within or close to the range of the internal consistency reliabilities reported in other studies. The internal consistency of each instrument with the possible exception of the Marlowe-Crowne SDS was demonstrated to be high.

Results of the Alpha Factor Analysis of the Fifty-three SD Scales

Prior to the testing of the hypotheses an alpha factor analysis of the fifty-three SD scales had to be performed to determine if the un-

TABLE 2

Means and Standard Deviations for TSCS, ACL, IAV, PH, and the Marlowe-Crowne SDS for Males, Females, and Total Sample

Instrument	Males (N=100)		Females (N=108)		Total Sample (N=208)	
	Mean	SD	Mean	SD	Mean	SD
TSCS	315.94	30.04	323.44	35.55	319.95	33.30
ACL	47.84	7.69	49.15	6.80	48.52	7.29
IAV	175.76	24.38	181.78	25.32	178.89	25.11
PH	50.80	12.33	53.57	12.36	52.24	12.46
SDS	12.21	4.96	14.66	4.79	13.48	5.04

TABLE 3

Means and Standard Deviations of Each of the Fifty-Three SD Scales for Males, Females, and the Total Sample

Scale	Males		Females		Total Sample	
	Mean	SD	Mean	SD	Mean	SD
kind-cruel	5.240	1.031	5.769	0.728	5.514	0.925
motivated-aimless	5.110	1.182	5.019	1.361	5.063	1.279
strong-weak	5.330	1.010	4.935	1.165	5.125	1.111
calm-excitable	4.230	1.548	3.259	1.646	3.726	1.672
heavy-light	3.820	1.314	3.787	1.348	3.803	1.332
eager-indifferent	5.010	1.212	5.426	1.188	5.226	1.218
participant-non-participant	5.030	1.360	5.398	1.269	5.221	1.326
large-small	4.380	1.156	3.991	1.411	4.178	1.309
complex-simple	4.230	1.469	4.167	1.607	4.197	1.543
friendly-unfriendly	5.530	1.014	6.093	0.740	5.822	0.926
relaxed-tense	5.060	1.287	4.731	1.525	4.889	1.425
likeable-unlikeable	5.210	1.160	5.602	1.045	5.413	1.119
hard-soft	4.390	1.085	3.102	1.209	3.721	1.319
affectionate-hostile	5.040	1.248	5.778	0.906	5.423	1.145
intelligent-unintelligent	5.540	0.984	5.250	1.055	5.389	1.032
leader-follower	4.800	1.158	4.583	1.019	4.688	1.093
free-constrained	5.170	1.217	5.000	1.240	5.082	1.232
clean-dirty	5.530	1.127	5.981	1.089	5.764	1.130
serious-humorous	3.030	1.330	2.972	1.350	3.000	1.341
severe-lenient	3.500	1.127	3.231	1.160	3.361	1.152
rugged-delicate	5.170	0.980	3.667	1.401	4.389	1.430
interesting-boring	4.900	1.082	5.361	0.810	5.139	0.978
important-unimportant	4.860	1.225	5.056	1.096	4.962	1.164
opaque-transparent	4.400	1.049	4.454	1.235	4.428	1.150
reserved-talkative	3.620	1.488	3.009	1.518	3.303	1.535
active-passive	5.490	1.044	5.565	1.249	5.529	1.156
independent-dependent	4.720	1.537	4.639	1.669	4.678	1.607
useful-useless	5.430	1.098	5.528	1.158	5.481	1.131
tough-fragile	5.360	0.911	4.426	1.321	4.875	1.234
wise-foolish	5.260	0.986	5.139	0.995	5.197	0.993
bold-timid	4.980	1.131	4.444	1.322	4.702	1.262
happy-sad	5.440	1.107	5.796	1.052	5.625	1.094
sociable-unsociable	5.300	1.187	5.796	1.043	5.558	1.142

(cont.)

TABLE 3 (cont.)

Scale	Males		Females		Total Sample	
	Mean	SD	Mean	SD	Mean	SD
sharp-dull	5.050	1.033	5.019	1.202	5.034	1.124
superior-inferior	4.690	1.036	4.463	0.897	4.572	0.973
honest-dishonest	5.160	1.440	5.583	1.140	5.380	1.310
energetic-lethargic	5.180	1.236	5.306	1.524	5.245	1.395
fresh-stale	4.880	1.186	5.046	1.294	4.966	1.246
competent-incompetent	5.250	1.004	5.352	1.048	5.303	1.028
rash-cautious	3.140	1.249	3.093	1.309	3.115	1.281
deep-shallow	4.570	1.107	4.676	1.304	4.625	1.214
enjoyable-unenjoyable	5.200	1.158	5.685	0.997	5.452	1.104
masculine-feminine	5.320	1.516	2.778	1.560	4.000	1.995
unselfish-selfish	4.900	1.425	4.991	1.555	4.947	1.494
good-bad	4.890	1.455	4.889	1.480	4.889	1.468
sensitive-insensitive	4.760	1.401	5.806	1.067	5.303	1.344
fast-slow	5.300	1.308	4.796	1.208	5.038	1.282
sweet-bitter	4.410	1.011	5.028	1.142	4.731	1.124
hot-cold	4.710	1.003	4.454	0.927	4.577	0.973
nice-awful	5.210	1.235	5.704	0.874	5.466	1.091
big-little	4.690	1.278	3.889	1.377	4.274	1.389
powerful-powerless	5.320	0.882	4.880	0.910	5.091	0.923
quiet-noisy	4.100	1.439	4.000	1.447	4.048	1.444

Note. - The adjective pairs are arranged such that the first adjective of the pair was assigned a seven and the second adjective of the pair was assigned a one. On the instrument the polarity of the scales was randomized.

TABLE 4

Internal Consistency Reliability of the

TSCS, ACL, IAV, PH, and Marlowe-Crowne SDS

Instrument	Coefficient Alpha	N
TSCS (Total P scale)	0.959	208
ACL (Self-Confidence scale)	0.879	208
IAV (Self-Concept scale)	0.955	208
PH	0.903	208
SDS	0.759	208

derlying factor structure could be classified as EPA. The alpha factor analysis (Table 5) of the fifty-three SD scales produced sixteen factors with positive generalizability. The sixteen factors accounted for 53.420% of the total variance. Only three of the sixteen factors were interpreted because thirteen of the factors were unable to meet the criteria of a generalizability coefficient $\geq .700$ and having at least two significant factor loadings. Factor 1 was identified as an Evaluative factor. The Evaluative factor had a generalizability coefficient = .953, accounted for 23.442% of the common variance, accounted for 12.523% of the total variance, and contained sixteen scales loading significantly. Factor 2 was identified as a Potency factor. The Potency factor had a generalizability coefficient = .871, accounted for 11.125% of the common variance, accounted for 5.943% of the total variance, and contained four scales loading significantly. Factor 3 was named an "Aspired-Self" factor. The "Aspired-Self" factor had a generalizability coefficient = .812, accounted for 9.662% of the common variance, accounted for 5.162% of the total variance, and contained five scales loading significantly. Factor 1 was identified as an Evaluative factor because of the predominance of Evaluative scales, as classified by previous research, loading significantly on the factor. The same procedure used for the identification of Factor 1 was used to identify Factor 2: the predominance of Potency scales, as classified by previous research, loading significantly on the factor. Factor 3 was named an "Aspired-Self" factor because of the image evoked by the five defining scales as a conglomerate. The qualities of being sharp, deep, fresh, energetic, and good seem to be qualities that any person would aspire to possess whether he is male or

TABLE 5

Generalizability Coefficient, Percent of Common Variance, Percent of Total Variance, Accumulative Percent of Total Variance, and the Number of Significant Factor Loadings for Each of the Factors with Positive Generalizability Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales for Total Sample (N=208)

Factor	Generalizability Coefficient	% of Common Variance	% of Total Variance	Accum. % of Total Variance	No. of Significant Factor Loadings*
1	.953	23.442	12.523	12.523	16
2	.871	11.125	5.943	18.466	4
3	.812	9.662	5.162	23.628	5
4	.718	4.222	2.255	25.884	1
5	.699	7.390	3.948	29.832	2
6	.662	7.192	3.842	33.674	3
7	.608	3.247	1.749	35.409	1
8	.542	3.677	1.964	37.373	2
9	.517	4.562	2.437	39.811	1
10	.472	4.407	2.354	42.165	2
11	.407	3.748	2.002	44.168	1
12	.346	3.303	1.764	45.933	1
13	.250	3.667	1.959	47.892	1
14	.170	3.013	1.609	49.502	1
15	.091	2.872	1.534	51.036	1
16	.011	4.463	2.384	53.420	1

Note. - All figures in Table 5 were calculated after a Varimax rotation, except for the generalizability coefficient which was computed before rotation.

Note. - Total common variance = 28.313

* $p < .01$

female. "The "Aspired-Self" factor was common to both sexes (Tables 8 and 10). Table 6 contains the defining scales and their factor loadings for the three retained factors.

It was at this stage that the investigator was alerted to the possibility of the second factor (Potency) being related to the sex of the respondent. To pursue this possibility, the sex of an individual was added as the fifty-fourth variable to the fifty-three SD scales. The fifty-four variables were intercorrelated and the resulting correlation matrix factor analyzed (alpha). The same factor structure emerged as previously reported (Tables 5 and 6), except that the sex variable was the largest loading variable (.711) on the Potency factor. Since the factor loading of .711 represented the correlation between the Potency factor and the sex variable, this result was indicative that the responses to the SD scales were highly related to the sex of the individual. Consequently, this finding suggested that the underlying factor structure of self-concept as measured by the SD method was different for males and females. As a result, each of the six research hypotheses was tested twice: once for males and once for females. Identical statistical procedures were used for each sex.

The results of the alpha factor analysis of the males' responses to the fifty-three SD scales are given in Tables 7 and 8. Sixteen factors emerged with positive generalizability. The sixteen factors accounted for 61.005% of the total variance. Of the sixteen factors only five were interpreted because eleven of the factors failed to meet the criteria of a generalizability coefficient $\geq .700$ and having at least two significant factor loadings. Factor 1, identified as an Evaluative

TABLE 6

The Defining Scales and Factor Loadings for Each of the Three Factors Meeting the Retention Criteria of Generalizability ≥ .700 and More than One Significant Factor Loading, Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales for Total Sample (N=208)

Factor 1 (Evaluative)		Factor 2 (Potency)	
Scale	Factor Loading	Scale	Factor Loading
sociable-unsociable (E)[a]	.716	rugged-delicate (P)	.734
happy-sad (E)	.709	tough-fragile (P)	.713
likeable-unlikeable	.681	masculine-feminine (P)	.589
useful-useless (E)	.584	bold-timid (P)	.569
interesting-boring (E)	.577		
important-unimportant (E)	.576		
friendly-unfriendly (E)	.568		
sweet-bitter (E)	.567		
enjoyable-unenjoyable (E)	.567		
active-passive (A)	.504		
reserved-talkative	-.501		
eager-indifferent (A)	.475		
kind-cruel (E)	.470		
nice-awful (E)	.461		
participant-non-participant	.455		
affectionate-hostile	.452		

Note. - All scales defining a factor are significant at the .01 level. A scale had to load ≥ .436 to be significant.

Note. - The adjective pairs are arranged such that the first adjective was assigned a seven and the second adjective of the pair was assigned a one. On the instrument the polarity of the scales was randomized.

[a]The letter in parentheses indicates the dimension that the scale represents as determined by previous studies: E = Evaluation, P = Potency, A = Activity, Blank = not previously determined.

(cont.)

TABLE 6 (cont.)

Factor 3 (Aspired-Self)	
Scale	Factor Loading
sharp-dull (A)	.648
fresh-stale (E)	.640
deep-shallow (P)	.584
energetic-lethargic (A)	.558
good-bad (E)	.529

TABLE 7

Generalizability Coefficient, Percent of Common Variance, Percent of Total Variance, Accumulative Percent of Total Variance, and the Number of Significant Factor Loadings for Each of the Factors with Positive Generalizability Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales: Males Only (N=100)

Factor	Generalizability Coefficient	% of Common Variance	% of Total Variance	Accum. % of Total Variance	No. of Significant Factor Loadings*
1	.953	19.244	11.740	11.740	26
2	.833	9.987	6.093	17.833	15
3	.779	5.920	3.611	21.444	8
4	.750	7.030	4.289	25.734	8
5	.714	7.246	4.420	30.154	4
6	.659	6.219	3.794	33.949	8
7	.648	5.658	3.451	37.401	6
8	.607	7.664	4.675	42.076	8
9	.523	3.717	2.267	44.344	4
10	.495	4.077	2.487	46.832	4
11	.432	3.655	2.230	49.062	5
12	.375	4.306	2.627	51.689	6
13	.335	3.439	2.098	53.788	3
14	.324	3.561	2.172	55.960	3
15	.121	4.326	2.639	58.600	3
16	.084	3.942	2.405	61.005	3

Note. - All figures in Table 7 were calculated after a Varimax rotation, except for the generalizability coefficient which was computed before rotation.

Note. - Total common variance = 32.333

* $p < .01$

TABLE 8

The Defining Scales and Factor Loadings for Each of the Five Factors Meeting the Retention Criteria of Generalizability ≥ .700 and More than One Significant Factor Loading, Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales: Males Only (N=100)

Factor 1 (Evaluative)		Factor 2 (Potency)	
Scale	Factor Loading	Scale	Factor Loading
friendly-unfriendly (E)[a]	.760	tough-fragile (P)	.725
nice-awful (E)	.726	strong-weak (P)	.619
kind-cruel (E)	.674	rugged-delicate (P)	.556
sociable-unsociable (E)	.631	bold-timid (P)	.508
affectionate-hostile	.580	powerful-powerless (P)	.473
happy-sad (E)	.554	happy-sad (E)	.424
likeable-unlikeable	.525	important-unimportant (E)	.382
superior-inferior (E)	.497	reserved-talkative	-.339
enjoyable-unenjoyable (E)	.465	enjoyable-unenjoyable (E)	.317
leader-follower	.462	useful-useless (E)	.303
sweet-bitter (E)	.452	likeable-unlikeable	.285
intelligent-unintelligent (E)	.449	free-constrained (P)	.278
competent-incompetent	.417	sociable-unsociable (E)	.277
rash-cautious (A)	-.409	fast-slow (A)	.271
interesting-boring (E)	.395	rash-cautious (A)	.251
unselfish-selfish (E)	.387		
sharp-dull (A)	.379		
participant-non-participant	.377		
honest-dishonest (E)	.351		
relaxed-tense (E)	.325		
severe-lenient (P)	-.317		
reserved-talkative	-.304		
sensitive-insensitive	.297		
important-unimportant (E)	.281		
masculine-feminine (P)	.270		
powerful-powerless (P)	.260		

Note. - All scales defining a factor are significant at the .01 level. A scale had to load ≥ .258 to be significant.

(cont.)

TABLE 8 (cont.)

Factor 3 (Mood)		Factor 4 (Aspired-Self)	
Scale	Factor Loading	Scale	Factor Loading
opaque-transparent (P)	.687	deep-shallow (P)	.673
enjoyable-unenjoyable (E)	.425	masculine-feminine (P)	.623
hot-cold (A)	.400	fresh-stale (E)	.532
complex-simple (A)	.389	sharp-dull (A)	.451
sweet-bitter (E)	-.363	complex-simple (A)	.326
hard-soft (P)	.347	wise-foolish (E)	.318
serious-humorous (P)	-.292	unselfish-selfish (E)	.312
motivated-aimless (A)	.281	fast-slow (A)	.280

Factor 5 (Physical Size)	
Scale	Factor Loading
large-small (P)	.809
big-little (P)	.755
heavy-light (P)	.677
independent-dependent	-.348

[a]The letter in parentheses indicates the dimension that the scale represents as determined by previous studies: E = Evaluation, P = Potency, A = Activity, Blank = not previous determined.

factor, had a generalizability coefficient = .953 and accounted for 19.244% and 11.740% of the common and total variances, respectively. Factor 2 was identified as a Potency factor. The Potency factor had a generalizability coefficient of .833, accounted for 9.87% of the common variance, and accounted for 6.093% of the total variance. Factor 3 was labeled a "Mood" factor. This factor had a generalizability coefficient = .779, accounted for 5.920% and 3.611% of the common and total variances, respectively. Factor 4 appeared to be similar to Factor 3 ("Aspired-Self") which had emerged previously (Table 6) in the factor analysis of the fifty-three SD scales using the total sample. Consequently, Factor 4 was also named an "Aspired-Self" factor. It had a generalizability coefficient of .750, accounted for 7.030% of the common variance, and accounted for 4.289% of the total variance. Factor 5 was labeled a "Physical Size" factor. The "Physical Size" factor had a generalizability coefficient = .714 and accounted for 7.246% and 4.420% of the common and total variances, respectively. Factor 1 was identified as an Evaluative factor because of the predominance of Evaluative scales loading significantly on the factor. Factor 2 was identified as a Potency factor because the largest significant factor loadings were predominately Potency scales. Factor 3 was named a "Mood" factor. The subjects were responding to the concept "ME AS I REALLY AM" and it appears as if they were describing two different "ME's" which were dependent upon their mood. One "ME AS I REALLY AM" was enjoyable, humorous, motivated, and hot (in the connotative sense); while the other "ME AS I REALLY AM" was opaque, complex, hard, and bitter. Factor 5 was labeled a "Physical Size" factor because three of the four defining bipolar-adjective scales

were adjectives commonly used to describe a person's physical size. Table 8 contains the defining scales and their factor loadings for the five retained factors.

The results of the alpha factor analysis of the females' responses to the fifty-three SD scales are presented in Tables 9 and 10. Sixteen factors emerged with positive generalizability. The sixteen factors accounted for 60.094% of the total variance. Of the sixteen factors only five were interpreted because eleven of the factors failed to meet the criteria of a generalizability coefficient $\geq$ .700 and having at least two significant factor loadings. Factor 1 identified as an Evaluative factor, had a generalizability coefficient of .943 and accounted for 16.279% and 9.783% of the common and total variances, respectively. The second factor was labeled the "Aspired-Self" factor. This factor had a generalizability coefficient of .839, accounted for 12.386% of the common variance, and accounted for 7.443% of the total variance. Factor 3 was identified as a Potency factor. The Potency factor had a generalizability coefficient = .824 and accounted for 7.173% and 4.310% of the common and total variances, respectively. Factor 4 was identified as an Activity factor. The Activity factor had a generalizability coefficient of .784, accounted for 7.957% of the common variance, and accounted for 4.782% of the total variance. Factor 5 was labeled an "Intellectual Ability" factor and it had a generalizability coefficient = .709 and accounted for 7.443% and 4.473% of the common and total variances, respectively. Factor 1 was identified as an Evaluative factor because of the predominance of Evaluative scales, as classified by previous research, loading significantly on the factor. The second factor was labeled the "Aspired-Self"

TABLE 9

Generalizability Coefficient, Percent of Common Variance, Percent of Total Variance, Accumulative Percent Of Total Variance, and the Number of Significant Factor Loadings for Each of the Factors with Positive Generalizability Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales: Females Only (N=108)

Factor	Generalizability Coefficient	% of Common Variance	% of Total Variance	Accum. % of Total Variance	No. of Significant Factor Loadings*
1	.943	16.279	9.783	9.783	23
2	.839	12.386	7.443	17.226	9
3	.824	7.173	4.310	21.537	8
4	.784	7.957	4.782	26.319	9
5	.709	7.443	4.473	30.792	6
6	.697	4.891	2.939	33.732	4
7	.661	4.824	2.899	36.631	5
8	.615	7.827	4.704	41.335	9
9	.581	6.917	4.157	45.492	3
10	.483	3.149	1.892	47.385	1
11	.408	4.180	2.511	49.897	4
12	.382	3.645	2.190	52.087	3
13	.333	4.004	2.406	54.494	2
14	.249	3.451	2.074	56.568	3
15	.129	2.478	1.489	58.057	2
16	.032	3.389	2.037	60.094	2

Note. - All figures in Table 9 were calculated after a Varimax rotation, except for the generalizability coefficient which was computed before rotation.

Note. - Total common variance = 31.850

* $p < .01$

TABLE 10

The Defining Scales and Factor Loadings for Each of the Five Factors Meeting the Retention Criteria of Generalizability ≥ .700 and More than One Significant Factor Loading, Resulting from an Alpha Factor Analysis of the 53 X 53 Intercorrelation Matrix of SD Scales: Females (N=108)

Factor 1 (Evaluative)		Factor 2 (Aspired-Self)	
Scale	Factor Loading	Scale	Factor Loading
eager-indifferent (A)	.687	masculine-feminine (P)	-.742
happy-sad (E)	.686	fresh-stale (E)	.738
sociable-unsociable (E)	.656	sharp-dull (A)	.730
important-unimportant (E)	.630	energetic-lethargic (A)	.689
useful-useless (E)	.628	good-bad (E)	.667
participant-non-participant	.590	unselfish-selfish (E)	.598
interesting-boring (E)	.493	rash-cautious (A)	-.468
powerful-powerless (P)	.476	deep-shallow (P)	.364
active-passive (A)	.385	fast-slow (A)	.324
relaxed-tense (A)	.361		
likeable-unlikeable	.343		
affectionate-hostile	.342		
enjoyable-unenjoyable	.340		
nice-awful (E)	.333		
clean-dirty (E)	.328		
reserved-talkative	-.316		
sweet-bitter (E)	.316		
motivated-aimless (A)	.309		
deep-shallow (P)	-.308		
calm-excitable (A)	-.300		
rash-cautious (A)	-.298		
leader-follower	.289		
superior-inferior (E)	.280		

Note. - All scales defining a factor are significant at the .01 level. A scale had to load ≥ .278 to be significant.

(cont.)

TABLE 10 (cont.)

Factor 3 (Potency)		Factor 4 (Activity)	
Scale	Factor Loading	Scale	Factor Loading
opaque-transparent (P)	.596	quiet-noisy (A)[a]	-.713
complex-simple (A)	.530	reserved-talkative	-.621
rugged-delicate (P)	.527	serious-humorous (P)	-.455
tough-fragile (P)	.493	active-passive (A)	.411
deep-shallow (P)	.378	enjoyable-unenjoyable (E)	.401
motivated-aimless (A)	.363	severe-lenient (P)	-.393
calm-excitable (A)	.324	strong-weak (P)	.316
bold-timid (P)	.311	bold-timid (P)	.312
		fast-slow (A)	.278

[a]The letter in parentheses indicates the dimension that the scale represents as determined by previous studies: E = Evaluation, P = Potency, A = Activity, Blank = not previously determined.

Factor 5 (Intellectual Ability)	
Scale	Factor Loading
wise-foolish (E)	.638
honest-dishonest (E)	.611
intelligent-unintelligent (E)	.560
fast-slow (A)	.486
competent-incompetent	.400
kind-cruel (E)	.321

factor because it appeared to be similar in content to Factor 3 ("Aspired-Self") which had emerged previously (Table 6) in the factor analysis of the fifty-three SD scales using the total sample. Factors 3 and 4 were identified as Potency and Activity factors, respectively, because of the significant loading of reference Potency and Activity scales on Factors 3 and 4, respectively. Such scales as tough-fragile, deep-shallow, and opaque-transparent have been found in previous research when applying the SD technique to many varied concepts to be representative of the Potency dimension. Such scales as active-passive and fast-slow have been commonly found to be representative of the Activity dimension. Factor 5 was interpreted as an "Intellectual Ability" factor because of the apparent semantic relationship between the defining scales. The scales defining the fifth factor that were instrumental in the interpretation of the factor as an "Intellectual Ability" factor were: wise-foolish, intelligent-unintelligent, competent-incompetent, and fast-slow. Table 10 contains the defining scales and their factor loadings for the five retained factors.

Results Related to the Investigation of Research Hypotheses I, II, and III

Table 11 contains the intercorrelation matrix of the five retained factors using weighted factor scores from the responses of the males to the fifty-three SD scales, the four criterion measures of self-concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS. The five factors, although slightly intercorrelated, do represent orthogonal dimensions which is an expected property of the factor analytic method and type of rotation utilized.

TABLE 11

Intercorrelation Matrix of the Five Factors (Using Weighted Factor Scores) from the Factor Analysis of the Fifty-Three SD Scales, the Four Criterion Measures (Using Raw Scores) of Self-Concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS: Males Only (N=100)

	Factor 1 (Evaluative)	Factor 2 (Potency)	Factor 3 (Mood)	Factor 4 (Aspired-Self)	Factor 5 (Physical Size)	TSCS	ACL	IAV	PH	SDS
Factor 1 (Evaluative)	1.000	0.018	0.016	0.013	0.009	0.331	0.152	0.432	0.352	0.114
Factor 2 (Potency)	0.018	1.000	0.017	0.018	0.008	0.171	0.286	0.150	0.183	-0.279
Factor 3 (Mood)	0.016	0.017	1.000	0.002	0.037	0.125	0.201	0.202	0.161	0.006
Factor 4 (Aspired-Self)	0.013	0.018	0.002	1.000	-0.006	0.135	0.061	0.171	0.116	0.008
Factor 5 (Physical Size)	0.009	0.008	0.037	-0.006	1.000	-0.072	-0.151	-0.162	-0.071	-0.125
TSCS	0.331	0.171	0.125	0.135	-0.072	1.000	0.182	0.551	0.513	0.299
ACL	0.152	0.286	0.201	0.061	-0.151	0.182	1.000	0.257	0.322	-0.030
IAV	0.432	0.150	0.202	0.171	-0.162	0.551	0.257	1.000	0.419	0.162
PH	0.352	0.183	0.161	0.116	-0.071	0.513	0.322	0.419	1.000	0.220
SDS	0.114	-0.279	0.006	0.008	-0.125	0.299	-0.030	0.162	0.220	1.000

Note. - The Thurstone Method (Thurstone, 1935) was the method used to calculate the differentially weighted factor scores for Factors 1-5.

Note. - Any correlation $\geq$ .196 is significant at the .05 alpha level.

The evidence to support Research Hypotheses, I, II, and III for males is given in Table 12. The multiple correlation between the Evaluative factor and the set of criterion measures of self-concept for males was .473. The F-ratio was 6.864, significant at the .05 level. Consequently, it was concluded that the multiple correlation between the Evaluative factor and the set of criterion measures of self-concept is significantly different from zero. Research Hypothesis II for males was also supported, that is: the multiple correlation between the Potency factor and the set of criterion measures of self-concept is significantly different from zero. The support of Research Hypothesis II was based on the magnitude of the multiple correlation (.313) between the Potency factor and the set of criterion measures of self-concept which produced an F-ratio (2.594) significant at the .05 alpha level. The investigation of Research Hypothesis III for males was not possible because the Activity factor did not emerge from the alpha factor analysis of the fifty-three SD scales. Although the "Mood" factor, the "Aspired-Self" factor, and the "Physical Size" factor were not hypothesized to emerge from the alpha factor analysis of the fifty-three SD scales, the multiple correlations between each of these factors and the set of criterion measures of self-concept were computed. Table 12 shows that none of these multiple correlations were significantly different from zero at the .05 level.

Table 13 shows the order of importance of the independent variables (TSCS, ACL, IAV, PH) in predicting the dependent variable (one of the five factors from the factor analysis of the fifty-three SD scales) for the sample of males. The selection of the first predictor was based on the highest zero-order correlation between the dependent variable and

TABLE 12

Multiple Correlations and F-Ratios for Each of the Five Factors from the Fifty-Three SD Scales with the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH): Weighted Solution, Males Only (N=100)

Dependent Variable from SD	Independent Variables TSCS, ACL, IAV, PH	
	Multiple R	F-Ratio
Factor 1 (Evaluative)	.473	6.864*
Factor 2 (Potency)	.313	2.594*
Factor 3 (Mood)	.259	1.712
Factor 4 (Aspired-Self)	.181	0.812
Factor 5 (Physical Size)	.200	0.993

* $p < .05$

TABLE 13

Order of Importance of the Independent Variables (TSCS, ACL, IAV, PH) in Predicting the Dependent Variable (One of the Five Factors from the Factor Analysis of the Fifty-Three SD Scales) Determined by the Improvement in the Multiple Correlation: Males Only (N=100)

Dependent Variable	Order of Independent Variables			
	First	Second	Third	Fourth
Factor 1 (Evaluative)	IAV (22.501)*	PH (4.428)*	TSCS (0.246)	ACL (0.000)
Factor 2 (Potency)	ACL (8.733)*	TSCS (1.571)	PH (0.198)	IAV (0.016)
Factor 3 (Mood)	IAV (4.171)*	ACL (2.492)	PH (0.238)	TSCS (0.009)
Factor 4 (Aspired-Self)	IAV (2.984)	PH (0.240)	TSCS (0.106)	ACL (0.005)
Factor 5 (Physical Size)	IAV (2.647)	ACL (1.301)	TSCS (0.069)	PH (0.026)

Note. - The F-ratio of the improvement in the multiple correlation with the addition of that variable is the number in parentheses under each independent variable.

* $p < .05$

the independent variables. A predictor was determined to be a significant predictor if the F-ratio of the improvement in the multiple correlation with the addition of that predictor was significant. The IAV and PH were significant predictors of the Evaluative factor and the ACL was the only significant predictor of the Potency factor.

Table 14 contains the intercorrelation matrix of the five retained factors using weighted factor scores from the responses of the females to the fifty-three SD scales, the four criterion measures of self-concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS.

The evidence to support Research Hypotheses I, II, and III for females is given in Table 15. The multiple correlation between the Evaluative factor and the set of criterion measures of self-concept for females was .558. The F-ratio for this correlation was 11.653 which was significant at the .05 alpha level. Thus, it was concluded that the multiple correlation between the Evaluative factor and the set of criterion measures of self-concept is significantly different from zero. Research Hypothesis II for females was not supported and it was concluded that the multiple correlation (.223) between the Potency factor and the set of criterion measures of self-concept is not significantly different from zero (F-ratio = 1.347) at the .05 alpha level. Research Hypothesis III for females was supported. Therefore, the multiple correlation between the Activity factor and the set of criterion measures of self-concept is significantly different from zero. The support of Research Hypothesis III was based upon the magnitude of the multiple correlation (.307) between the Activity factor and the set of criterion measures of self-concept which produced an F-ratio (2.695) significant at the .05 alpha

TABLE 14

Intercorrelation Matrix of the Five Factors (Using Weighted Factor Scores) from the Fifty-Three SD Scales, the Four Criterion Measures (Using Raw Scores) of Self-Concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS: Females Only (N = 108)

	Factor 1 (Eval.)	Factor 2 (Aspired-Self)	Factor 3 (Potency)	Factor 4 (Activity)	Factor 5 (Intel. Ability)	TSCS	ACL	IAV	PH	SDS
Factor 1 (Eval.)	1.000	0.017	-0.002	0.016	-0.001	0.435	0.169	0.477	0.430	0.274
Factor 2 (Aspired-Self)	0.017	1.000	0.007	0.007	-0.029	0.039	-0.058	0.176	0.022	0.198
Factor 3 (Potency)	-0.002	0.007	1.000	-0.020	-0.024	0.124	0.151	0.126	0.168	-0.047
Factor 4 (Activity)	0.016	0.007	0.020	1.000	0.015	-0.032	0.302	-0.023	0.014	-0.122
Factor 5 (Intel. Ability)	-0.001	-0.029	-0.024	0.015	1.000	-0.235	0.044	0.424	0.091	0.008
TSCS	0.435	0.039	0.124	-0.032	0.235	1.000	0.076	0.605	0.610	0.308
ACL	0.169	-0.058	0.151	0.302	0.044	0.076	1.000	0.071	0.118	-0.140
IAV	0.477	0.176	0.126	-0.023	0.424	0.605	0.071	1.000	0.404	0.288
PH	0.430	0.022	0.168	0.014	0.091	0.610	0.118	0.404	1.000	0.059
SDS	0.274	0.198	-0.047	-0.220	0.008	0.308	-0.140	0.288	0.059	1.000

Note. - The Thurstone Method (Thurstone, 1935) was the method employed to calculate the differentially weighted factor scores for Factors 1-5.

Note. - Correlations $\geq$ .188 are significantly different from zero at the .05 level.

TABLE 15

Multiple Correlations and F-Ratios for Each of the Five Factors from the Fifty-Three SD Scales with the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH): Weighted Solution, Females Only (N=108)

Dependent Variable from SD	Independent Variables TSCS, ACL, IAV, PH	
	Multiple R	F-Ratio
Factor 1 (Evaluative)	.558	11.653*
Factor 2 (Aspired-Self)	.207	1.157
Factor 3 (Potency)	.223	1.347
Factor 4 (Activity)	.307	2.695*
Factor 5 (Intel. Ability)	.434	5.992*

* $p < .05$

level. Although the "Aspired-Self" factor and the "Intellectual Ability" factor were not hypothesized to emerge from the alpha factor analysis of the fifty-three SD scales, the multiple correlation between each of these factors and the set of criterion measures of self-concept was computed. Table 15 shows that the multiple correlation between the "Aspired-Self" factor and the set of criterion measures of self-concept was not significant at the .05 level. This same result occurred for the "Aspired-Self" factor for males. However, the multiple correlation (.434) between the "Intellectual Ability" factor and the set of criterion measures of self-concept produced an F-ratio (5.992) that was significant at the .05 alpha level. Thus, it was concluded that the multiple correlation between the "Intellectual Ability" factor and the set of criterion measures of self-concept was significant.

Table 16 shows the order of importance of the independent variables (TSCS, ACL, IAV, PH) in predicting the dependent variable (one of the five factors from the factor analysis of the fifty-three SD scales) for the sample of females. The IAV and PH were significant predictors of the Evaluative factor. The ACL was the only significant predictor of the Activity factor and the IAV was the only significant predictor of the "Intellectual Ability" factor.

Results Related to the Investigation of Research Hypotheses IV, V, and VI

Table 11, presented previously (p. 48), indicated that the correlation (-.279) for males between the Potency factor and a measure of social desirability (Marlowe-Crowne SDS) was significantly different from zero at the .05 alpha level. The correlations between the four other re-

TABLE 16

Order of Importance of the Independent Variables (TSCS, ACL, IAV, PH) in Predicting the Dependent Variables (One of the Five Factors from the Factor Analysis of the Fifty-Three SD Scales) Determined by the Improvement in the Multiple Correlation: Females Only (N = 108)

Dependent Variable	Order of Independent Variables			
	First	Second	Third	Fourth
Factor 1 (Evaluative)	IAV (31.367)*	PH (10.010)*	ACL (1.835)	TSCS (0.575)
Factor 2 (Aspired-Self)	IAV (3.418)	TSCS (0.781)	ACL (0.495)	PH (0.006)
Factor 3 (Potency)	PH (3.112)	ACL (1.944)	IAV (0.388)	TSCS (0.002)
Factor 4 (Activity)	ACL (10.641)*	TSCS (0.356)	IAV (0.028)	PH (0.028)
Factor 5 (Intel. Ability)	IAV (23.292)*	PH (0.999)	ACL (0.067)	TSCS (0.048)

Note. - The F-ratio of the improvement in the multiple correlation with the addition of that variable is the number in parentheses under each independent variable.

* $p < .05$

tained factors for males (Evaluative, "Mood," "Aspired-Self," "Physical Size") and the measure of social desirability were not significantly different from zero at the .05 alpha level. One can conclude that the measurement of the Evaluation dimension for males was not influenced by a social desirability factor. Consequently, there was no need to investigate Research Hypothesis IV for males. Research Hypothesis VI for males was not investigated either because the Activity factor did not emerge from the males' factor structure. However, one can conclude that the Potency dimension for males could be influenced by a social desirability factor.

Table 14, also presented previously (p. 53), indicated that the correlation (.274) for females between the Evaluative factor and the measure of social desirability was significantly different from zero at the .05 alpha level. The correlation (.198) between the "Aspired-Self" factor and the measure of social desirability was also found to be significantly different from zero at the .05 alpha level. The correlations between the other three retained factors for females (Potency, Activity, "Intellectual Ability") and the measure of social desirability were not of sufficient magnitude to be considered significantly different from zero at the .05 alpha level. Thus, one can conclude that the measurement of the Potency and Activity dimensions for females was not influenced by a social desirability factor. Consequently, there was no need to investigate Research Hypotheses V and VI for females. However, one can conclude that the Evaluation dimension for females could be influenced by a social desirability factor.

The results of the investigation of the extent to which the social desirability factor influenced the Evaluative factor for females and the Potency factor for males are presented in Tables 17-19. Table 17 contains the intercorrelation matrix of the Potency factor, TSCS, ACL, IAV, and PH after the influence of the social desirability factor was removed from each of the variables for the sample of males. Table 18 contains the intercorrelation matrix of the Evaluative factor, TSCS, ACL, IAV, and PH after the influence of the social desirability factor was removed from each of the variables for the sample of females.

The evidence in support of Research Hypothesis IV for females and Research Hypothesis V for males is presented in Table 19. The research hypothesis in both instances was supported on the basis of the magnitude of the multiple correlation. Therefore, the following two conclusions can be drawn:

I. When the effect of social desirability has been statistically removed from the Evaluative factor and the set of criterion measures of self-concept for the sample of females, there is a significant multiple correlation between the Evaluative factor and the set of criterion measures of self-concept.

II. When the effect of social desirability has been statistically removed from the Potency factor and a set of criterion measures of self-concept for the sample of males, there is a significant multiple correlation between the Potency factor and the set of criterion measures of self-concept.

Thus, even though it was found that the Evaluation dimension for females and the Potency dimension for males could be influenced by the social de-

TABLE 17

Intercorrelation Matrix of Partial Correlation Coefficients: Social Desirability Partialed from the Potency Factor and the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH) Weighted Solution, Males Only (N=100)

	TSCS	ACL	IAV	PH	Potency
TSCS	1.000	0.201	0.534	0.481	0.279
ACL	0.201	1.000	0.266	0.338	0.289
IAV	0.534	0.266	1.000	0.399	0.207
PH	0.481	0.338	0.399	1.000	0.262
Potency	0.279	0.289	0.207	0.262	1.000

TABLE 18

Intercorrelation Matrix of Partial Correlation Coefficients: Social Desirability Partialed from the Evaluative Factor and the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH) Weighted Solution, Females Only (N = 108)

	TSCS	ACL	IAV	PH	Evaluative
TSCS	1.000	0.127	0.568	0.624	0.383
ACL	0.127	1.000	0.118	0.128	0.218
IAV	0.568	0.118	1.000	0.406	0.433
PH	0.624	0.128	0.406	1.000	0.431
Evaluative	0.383	0.218	0.433	0.431	1.000

TABLE 19

Multiple Correlation Between the Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH) and a Factor from the Fifty-Three SD Scales which had the Marlowe-Crowne SDS as One of Its Significant Predictors: Multiple Correlations Calculated from an Intercorrelation Matrix which had Social Desirability Statistically Removed from Each of the Variables

Group	N	Dependent Variable	Independent Variables	Multiple R	F-Ratio
Males	100	Potency Factor	TSCS, ACL, IAV, PH	.375	3.846*
Females	108	Evaluative Factor	TSCS, ACL, IAV, PH	.535	10.362*

* $p < .05$

sirability factor, the extent of this influence upon each of these dimensions was not of sufficient magnitude to render them invalid measures of self-concept.

Results Related to the Development of an SD Instrument with Specially Selected Scales to Measure Self-Concept

The overall orientation of the investigation was the development of an SD instrument to measure self-concept containing specially selected scales developed through factor analytic techniques on which factor scores could be computed without resorting to a complicated differential weighting procedure. In addition, the investigator desired that the self-concept factors not correlate significantly with the social desirability factor. Table 20 contains those scales that were defining scales on each of the factors resulting from the factor analysis of the fifty-three SD scales for the sample of males which had a significant multiple correlation with the set of criterion measures of self-concept. Each of the scales was correlated with the weighted Evaluative factor score, the weighted Potency factor score, and the Marlowe-Crowne SDS. Any scale that correlated significantly with the Marlowe-Crowne SDS or a weighted factor score of which it was not a defining scale, was rejected as a scale to be used in the computation of the unweighted factor score. This decision process resulted in the retention of fourteen scales of the original twenty-three defining scales of the Evaluative factor and three scales of the original ten defining scales of the Potency factor. Thus the following fourteen scales were used in the calculation of a male's unweighted Evaluative factor score: kind-cruel, participant-non-partici-

TABLE 20

Correlations Between the Defining Scales on Each of the Factors from the Factor Analysis of the Fifty-Three SD Scales which had a Significant Multiple Correlation with the Set of Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH) with the Marlowe-Crowne SDS, the Weighted Evaluative Factor Score, and the Weighted Potency Factor Score: Males Only (N = 100)

Scale	Largest Significant Loading On	Evaluative Factor	Potency Factor	SDS	Decision
kind-cruel	Evaluative	.706	-.133	.162	Accept
participant-non-participant	Evaluative	.394	-.008	-.024	Accept
friendly-unfriendly	Evaluative	.795	.032	.011	Accept
relaxed-tense	Evaluative	.340	.104	.120	Accept
affectionate-hostile	Evaluative	.607	.033	.053	Accept
intelligent-unintelligent	Evaluative	.470	-.049	.054	Accept
leader-follower	Evaluative	.483	.033	.070	Accept
severe-lenient	Evaluative	-.332	.073	-.018	Accept
interesting-boring	Evaluative	.414	.157	-.005	Accept
happy-sad	Evaluative	.580	.455	.019	Reject
sociable-unsociable	Evaluative	.660	.297	.060	Reject
sharp-dull	Evaluative	.397	-.004	.093	Accept
superior-inferior	Evaluative	.520	.139	.063	Accept
honest-dishonest	Evaluative	.367	-.155	.294	Reject
competent-incompetent	Evaluative	.437	.198	.035	Reject
rash-cautious	Evaluative	-.428	.270	-.212	Reject
enjoyable-unenjoyable	Evaluative	.487	.340	.017	Reject
masculine-feminine	Evaluative	.283	.178	-.018	Reject
selfish-unselfish	Evaluative	.405	.081	.261	Reject
sensitive-insensitive	Evaluative	.371	.051	-.081	Accept

(cont.)

TABLE 20 (cont.)

Scale	Largest Significant Loading On	Evaluative Factor	Potency Factor	SDS	Decision
sweet-bitter	Evaluative	.473	.146	.080	Accept
nice-awful	Evaluative	.760	-.097	.178	Accept
likeable-unlikeable	Evaluative	.550	.305	.056	Reject
strong-weak	Potency	.077	.664	-.147	Accept
free-constrained	Potency	.051	.298	-.025	Accept
rugged-delicate	Potency	-.159	.596	-.202	Reject
important-unimportant	Potency	.294	.410	.067	Reject
reserved-talkative	Potency	-.318	-.363	.051	Reject
useful-useless	Potency	.248	.325	.071	Reject
tough-fragile	Potency	-.032	.777	-.222	Reject
bold-timid	Potency	.234	.545	-.193	Reject
fast-slow	Potency	.096	.290	-.149	Accept
powerful-powerless	Potency	.272	.507	-.097	Reject

Note. - The column labeled "Largest Significant Loading On" refers to which factor in Table 8 that the scale loaded on maximally.

Note. - Correlations > .196 are significant at the .05 alpha level.

pant, friendly-unfriendly, relaxed-tense, affectionate-hostile, intelligent-unintelligent, leader-follower, severe-lenient, interesting-boring, sharp-dull, superior-inferior, sensitive-insensitive, sweet-bitter, and nice-awful. The following three scales were used in the calculation of a male's unweighted Potency factor score: strong-weak, free-constrained, and fast-slow.

The mean rating of those scales defining a factor represented that factor's unweighted factor score. Henceforth, the seventeen SD scales, collectively, will be referred to as the refined SD instrument.

The intercorrelation matrix (Table 21) of the Evaluative factor (using unweighted factor scores), Potency factor (using unweighted factor scores), TSCS, ACL, IAV, PH, and Marlowe-Crowne SDS for the sample of males indicated that the Evaluative factor and the Potency factor were not correlated significantly with the Marlowe-Crowne SDS, but the Evaluative and Potency factors were significantly correlated.

Table 22 gives the first order correlations of the Evaluative factor (using unweighted factor scores), Potency factor (using unweighted factor scores), and the refined SD instrument (using total raw scores) with each of the criterion measures of self-concept (TSCS, ACL, IAV, PH) for the sample of males. A total score was determined by summing a person's responses to the fourteen Evaluative scales and the three Potency scales which comprised the refined SD instrument for males. The multiple correlations between the Evaluative factor, the Potency factor, the refined SD instrument, and the set of criterion measures of self-concept were .629, .500, and .674, respectively. The F-ratios corresponding to the above multiple correlations were 13.378, 7.949, and 19.912; each

TABLE 21

Intercorrelation Matrix of the Two Self-Concept Factors from the Factor Analysis of the Fifty-Three SD Scales, the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS: Unweighted Solution, Males Only (N = 100)

	Evaluative	Potency	TSCS	ACL	IAV	PH	SDS
Evaluative	1.000	0.335	0.380	0.241	0.587	0.449	0.096
Potency	0.335	1.000	0.242	0.331	0.445	0.263	-0.155
TSCS	0.380	0.242	1.000	0.182	0.551	0.513	0.299
ACL	0.241	0.331	0.182	1.000	0.257	0.322	-0.030
IAV	0.587	0.445	0.551	0.257	1.000	0.419	0.162
PH	0.449	0.263	0.513	0.322	0.419	1.000	0.220
SDS	0.096	-0.155	0.299	-0.030	0.162	0.220	1.000

Note. - Correlations > .196 are significant at the .05 level.

TABLE 22

First Order Correlations of the Evaluative Factor (Using Unweighted Factor Scores), Potency Factor (Using Unweighted Factor Scores), and Refined SD Instrument (Using Total Raw Scores) with Each of the Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH); Multiple Correlations between the Evaluative Factor (Using Unweighted Factor Scores), Potency Factor (Using Unweighted Factor Scores), Refined SD Instrument (Using Total Raw Scores) and the Set of Criterion Measures of Self-Concept; Coefficient Alphas for the Evaluative Factor, the Potency Factor, and the Refined SD Instrument; Males Only (N=100)

Variable	TSCS	ACL	IAV	PH	Multiple R	F-Ratio	Coef. α
Evaluative Factor (unweighted factor scores)	.380	.241	.587	.449	.629	13.378*	.784
Potency Factor (unweighted factor scores)	.242	.331	.445	.263	.500	7.949*	.474
Refined SD Instrument (total score)	.397	.295	.631	.465	.674	19.912*	.824

* $p < .05$

F-ratio was significant at the .05 level. The internal consistency reliabilities (coefficient alpha) for the Evaluative factor, the Potency factor, and the refined SD instrument were .784, .474, and .824, respectively.

Table 23 contains those scales that were defining scales on each of the factors resulting from the factor analysis of the fifty-three SD scales for the sample of females which had a significant multiple correlation with the set of criterion measures of self-concept. Each of the scales was correlated with the weighted Evaluative factor score, the weighted Activity factor score, the weighted "Intellectual Ability" factor score, and the Marlowe-Crowne SDS. Any scale that correlated significantly with the Marlowe-Crowne SDS or a weighted factor score of which it was not a defining scale, was rejected as a scale to be used in the computation of the unweighted factor score. This decision process resulted in the retention of ten of the twenty original defining scales of the Evaluative factor, three of the eight original defining scales of the Activity factor, and four of the six original defining scales of the "Intellectual Ability" factor. Thus, the following ten scales were used in the calculation of a female's unweighted Evaluative factor score: motivated-aimless, calm-excitable, eager-indifferent, participant-non-participant, relaxed-tense, likeable-unlikeable, happy-sad, sociable-unsociable, nice-awful, and powerful-powerless. The following three scales were used in the calculation of a female's unweighted Activity factor score: strong-weak, serious-humorous, and severe-lenient. The following four scales were used to calculate a female's unweighted "Intellectual Ability" factor

TABLE 23

Correlations between the Defining Scales on Each of the Factors from the Factor Analysis of the Fifty-Three SD Scales which had a Significant Multiple Correlation with the Set of Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH) with the Marlowe-Crowne SDS, the Weighted Evaluative Factor Score, the Activity Factor Score, and the Intellectual Ability Factor Score: Females Only (N = 108)

Scale	Largest Significant Loading On	Evaluative Factor	Activity Factor	Intellectual Ability Factor	SDS	Decision
motivated-aimless	Evaluative	.325	-.042	-.084	.032	Accept
calm-excitable	Evaluative	-.316	-.158	-.079	.047	Accept
eager-indifferent	Evaluative	.722	-.024	.236	.171	Accept
participant-non-participant	Evaluative	.620	.049	.159	.173	Accept
relaxed-tense	Evaluative	.379	.121	.030	.130	Accept
likeable-unlikeable	Evaluative	.361	.150	.010	.157	Accept
affectionate-hostile	Evaluative	.360	.123	.236	.234	Reject
leader-follower	Evaluative	.304	.053	.052	.266	Reject
clean-dirty	Evaluative	.345	-.163	.141	.302	Reject
interesting-boring	Evaluative	.518	.034	.062	.291	Reject
important-unimportant	Evaluative	.662	-.210	.125	.331	Reject
useful-useless	Evaluative	.660	-.040	.146	.312	Reject
happy-sad	Evaluative	.721	.036	-.148	.076	Accept
sociable-unsociable	Evaluative	.690	.244	-.158	.119	Accept
superior-inferior	Evaluative	.295	-.233	.109	.202	Reject
rash-cautious	Evaluative	-.313	.211	-.139	-.136	Reject
deep-shallow	Evaluative	-.324	.182	.131	-.192	Reject
sweet-bitter	Evaluative	.332	-.103	.153	.348	Reject
nice-awful	Evaluative	.350	-.158	.185	.181	Accept
powerful-powerless	Evaluative	.500	.073	-.040	.124	Accept
strong-weak	Activity	.114	.342	.113	.039	Accept

(cont.)

TABLE 23 (cont.)

Scale	Largest Significant Loading On	Evaluative Factor	Activity Factor	Intellectual Ability Factor	SDS	Decision
serious-humorous	Activity	-.004	-.492	.054	.018	Accept
severe-lenient	Activity	.115	-.425	-.078	.001	Accept
reserved-talkative	Activity	-.332	-.672	.168	.056	Reject
active-passive	Activity	.405	.445	.110	.111	Reject
bold-timid	Activity	.107	.337	-.204	-.005	Reject
enjoyable-unenjoyable	Activity	.357	.434	.254	.029	Reject
quiet-noisy	Activity	.144	-.772	.018	.337	Reject
kind-cruel	Intel. Ability	.250	-.226	.351	.255	Reject
intelligent-unintelligent	Intel. Ability	.211	-.118	.613	.137	Accept
wise-foolish	Intel. Ability	.217	-.031	.697	.116	Accept
honest-dishonest	Intel. Ability	.052	.077	.667	.087	Accept
competent-incompetent	Intel. Ability	.126	-.039	.438	-.095	Accept
fast-slow	Intel. Ability	.165	.301	.531	.005	Reject

Note. - The column labeled "Largest Significant Loading On" refers to which factor in Table 10 that the scale loaded on maximally.

Note. - Correlations > .188 are significant at the .05 level.

score: intelligent-unintelligent, wise-foolish, honest-dishonest, and competent-incompetent.

The intercorrelation matrix (Table 24) of the Evaluative factor (using unweighted factor scores), Activity factor (using unweighted factor scores), "Intellectual Ability" factor (using unweighted factor scores), TSCS, ACL, IAV, PH, and the Marlowe-Crowne SDS for the sample of females indicated that the Evaluative factor, Activity factor, and "Intellectual Ability" factor were not correlated significantly with the Marlowe-Crowne SDS, but the Evaluative and the "Intellectual Ability" factors were significantly correlated.

Table 25 gives the first order correlations of the Evaluative factor (using unweighted factor scores), the Activity factor (using unweighted factor scores), the "Intellectual Ability" factor, and the refined SD instrument (using total raw scores) with each of the criterion measures of self-concept (TSCS, ACL, IAV, PH) for the sample of females. The total score was determined by summing a person's responses to the ten Evaluative scales and the four "Intellectual Ability" scales which comprised the refined SD instrument for females. The Activity scales were not included on the refined SD instrument because the Activity factor (unweighted solution) did not correlate significantly with the criterion measures of self-concept (Table 25). Henceforth, the fourteen SD scales (ten Evaluative scales plus the four "Intellectual Ability" scales), collectively, will be referred to as the refined SD instrument. The multiple correlations between the Evaluative factor, the Activity factor, the "Intellectual Ability" factor, the refined SD instrument and the set of criterion measures of self-concept were .546, .146, .561, and .648, re-

TABLE 24

Intercorrelation Matrix of the Three Self-Concept Factors from the Factor Analysis of the Fifty-Three SD Scales, the Four Criterion Measures of Self-Concept (TSCS, ACL, IAV, PH), and the Marlowe-Crowne SDS: Unweighted Solution, Females Only (N = 108)

	Evaluative	Activity	Intell. Ability	TSCS	ACL	IAV	PH	SDS
Evaluative	1.000	0.124	0.280	0.396	0.213	0.479	0.379	0.177
Activity	0.124	1.000	0.115	0.050	0.105	0.092	0.084	0.006
Intell. Ability	1.280	0.115	1.000	0.402	0.101	0.551	0.274	0.084
TSCS	0.396	0.050	0.402	1.000	0.076	0.605	0.610	0.308
ACL	0.213	0.104	0.101	0.076	1.000	0.071	0.118	-0.140
IAV	0.479	0.092	0.551	0.605	0.071	1.000	0.404	0.288
PH	0.379	0.083	0.274	0.610	0.118	0.404	1.000	0.059
SDS	0.177	0.006	0.084	0.308	-0.140	0.288	0.059	1.000

Note. - Correlations > .188 are significant at the .05 level.

TABLE 25

First Order Correlations of the Evaluative Factor (Using Unweighted Factor Scores), Activity Factor (Using Unweighted Factor Scores), Intellectual Ability Factor (Using Unweighted Factor Scores), Refined SD Instrument (Using Total Raw Scores) with Each of the Criterion Measures of Self-Concept (TSCS, ACL, IAB, PH); Multiple Correlations between the Evaluative Factor (Using Unweighted Factor Scores), Activity Factor (Using Unweighted Factor Scores), Intellectual Ability Factor (Using Unweighted Factor Scores), Refined SD Instrument (Using Total Raw Scores) and the Set of Criterion Measures of Self-Concept; Coefficient Alphas for the Evaluative Factor, the Activity Factor, the Intellectual Ability Factor, and the Refined SD Instrument: Females Only (N = 108)

Variable	TSCS	ACL	IAV	PH	Multiple R	F-Ratio	Coef. α
Evaluative Factor (unweighted factor score)	.396	.213	.479	.379	.546	10.948*	.678
Activity Factor (unweighted factor score)	.050	.105	.092	.084	.146	0.559	.069
Intell. Ability (unweighted factor score)	.402	.101	.551	.274	.561	11.848*	.648
Refined SD Instrument (total score)	.471	.200	.602	.417	.648	18.750*	.766

* $p < .05$

spectively. The F-ratios corresponding to the above multiple correlations were 10.948, 0.559, 11.848, and 18.750; each F-ratio was significant at the .05 alpha level, except for the Activity factor's F-ratio which was not significant at the .05 alpha level. The internal consistency reliabilities (coefficient alpha) for the Evaluative factor, Activity factor, "Intellectual Ability" factor, and the refined SD instrument were .678, .069, .648, and .766, respectively.

DISCUSSION AND CONCLUSIONS

The purpose of this study was to develop an SD instrument to measure self-concept that would not be influenced by social desirability. The process used to develop the instrument attended to the following areas of concern:

1. A confirmation of the EPA factor structure
2. The validation of the EPA dimensions as measures of self-concept
3. An investigation of the extent to which the social desirability factor influenced the EPA dimensions

In this chapter results are discussed, conclusions are drawn from the analysis of the data, and recommendations for further investigation for each of the above areas of concerns are made.

Discussion of Results and Conclusions Regarding the Confirmation of the EPA Factor Structure

Discussion. An alpha factor analysis of the total sample's responses (100 males and 108 females) on fifty-three SD scales to the concept "ME AS I REALLY AM" produced three interpretable factors: Evaluative, Potency, and "Aspired-Self." A close inspection of the resulting factor structure as well as the results of the additional analyses discussed in Chapter III revealed that the underlying factor structure of self-concept

as measured by the SD method was different for males and females. Other investigators (Kubiniec, 1970; Farr et al., 1972) have found sufficient sex differences in self-concept to suggest that separate analyses for males and females should be performed. Thus the responses of the males and females to the fifty-three SD scales were factor analyzed separately. The males' factor structure consisted of the following five factors: Evaluative, Potency, "Mood," "Aspired-Self," and "Physical Size." The females' factor structure also contained five factors: Evaluative, "Aspired-Self," Potency, Activity, and "Intellectual Ability." The generalizability coefficients for the above ten factors ranged from .709 to .953. Interpreting the generalizability coefficients as reliability coefficients, one can ascertain with some degree of confidence that the same factors would appear under varied conditions and under a variety of circumstances. Using the coefficients as validity coefficients, the factors can be viewed as good representatives of the self-concept domain.

The obtaining of factors other than the three basic SD factors, EPA, can be viewed as additional evidence to support the position of several researchers that the dimensionality of SD ratings is not a completely settled issue. While the literature supports the validity of the EPA dimensions as the basic structure underlying averaged SD ratings, a number of studies (Green & Goldfried, 1965; Komorita & Bass, 1967; Norman, 1963; Wiggins & Fishbein, 1969) provide strong evidence that the situation is more complicated when one deals with the structure of individual judgments rather than group means. In particular, whenever factor analyses of adjective ratings are performed across individual ratings rather than over group means, more than the three EPA factors are found. Komorita

and Bass (1967) found that the Evaluation dimension splintered into three subdimensions when analyses were performed over individual ratings rather than group means. Wiggins and Fishbein (1969) found that there are different types of subjects, some employing a two-dimensional structure (EP), others a three-dimensional structure (EPA), and still others a four-dimensional structure (EPA with either the Evaluation or the Activity dimension splintering into two factors). Borgatta (1964) and Norman (1963) found that when adjective ratings are used to assess persons, one frequently finds about five important factors appearing as was the case in this investigation for both males and females.

Conclusions. The following conclusions can be drawn regarding the attempted confirmation of the EPA factor structure underlying the measurement of self-concept through the SD technique:

1. The underlying factor structure was different for males and females.
2. The factor structure for males consisted of an Evaluative factor, a Potency factor, a "Mood" factor, an "Aspired-Self" factor, and a "Physical Size" factor. Thus only the Evaluative and Potency factors were confirmed as underlying the males' factor structure.
3. The factor structure for females also produced an Evaluative factor, an "Aspired-Self" factor, and a Potency factor. Two additional factors within the females' factor structure were obtained: an Activity factor and an "Intellectual Ability" factor. Thus the EPA factor structure was confirmed for females.

4. The five retained factors for males accounted for only 30.15% of the total variance. The five retained factors for females accounted for only 30.79% of the total variance. Since the sample of scales used in an SD study is of critical importance in determining dimensionality because a factor can appear only if several scales measuring that factor are included in the analyses, it is conceivable that other factors remain to be discovered. Thus, the discovery of factors of self-concept in this study was dependent upon the adequacy of the sampling of SD scales to represent all possible dimensions of self-concept.

Recommendation. The "Aspired-Self," "Mood," "Intellectual Ability," and "Physical Size" factors were not hypothesized to emerge. Consequently, these factors were named post hoc in a subjective manner. Additional investigations should be initiated to establish empirically the validity of the factor labels.

Discussion of Results and Conclusions Regarding the Validation of the EPA Dimensions as Measures of Self-Concept

Discussion. If the factors produced from the factor analysis of the subjects' responses to the concept "ME AS I REALLY AM" on the fifty-three SD scales are valid dimensions of self-concept, then the resultant factors would be expected to correlate with other instruments that purportedly measure self-concept. The extent to which an instrument correlates with other instruments measuring the same trait indicates the degree of convergent validity that the instrument possesses. Thus each of

the five retained factors resulting from the factor analysis of the males' responses to the fifty-three SD scales and each of the five retained factors resulting from the factor analysis of the females' responses to the fifty-three SD scales was correlated simultaneously with four instruments (TSCS, ACL, IAV, PH) purporting to measure self-concept. For males, only the Evaluative factor and Potency factor had significant multiple correlation with the four instruments. For females, only the Evaluative factor, Activity factor, and "Intellectual Ability" factor had a significant multiple correlation with the four instruments. The IAV, TSCS, and PH measured an evaluative component of self-concept for both males and females, whereas the ACL measured a potency component of self-concept for males and an activity component of self-concept for females. Only the IAV was a significant predictor of the "Intellectual Ability" factor for females.

Conclusions. Based on a factor analysis of the SD scales and correlations with the criterion set of measures of self-concept the following conclusions can be drawn regarding the validation of the EPA dimensions as measures of self-concept:

1. The convergent validity of the Evaluation (.473) and Potency (.313) dimensions as measures of self-concept for males was demonstrated.
2. The convergent validity of the Evaluation (.558) and Activity (.307) dimensions as measures of self-concept for females was demonstrated.
3. The convergent validity of an unhypothesized dimension, "In-

tellectual Ability" (.434) as a measure of self-concept for females was demonstrated.

4. The TSCS, IAV, and PH measured an evaluative component of self-concept for both males and females.

5. The ACL measured a potency component of self-concept for males and an activity component of self-concept for females. This result seems reasonable in light of the interpretation of the self-confidence scale on the ACL. The high-scorer is assertive, affiliative, outgoing, persistent, an actionist, that is, he is both "potent" and "active." He makes a distinct impression on others who see him as forceful, self-confident, determined, ambitious, and opportunistic (see page 16 for a complete description of the scale).

Recommendations. A review of the literature with respect to the measurement of self-concept through the SD technique has demonstrated the lack of agreement by researchers on which SD dimensions to include on an instrument. The factor analysis of the SD scales produced five factors for both the males and the females, but only the Evaluation and Potency dimensions for males and the Evaluation, Activity, and "Intellectual Ability" dimensions for females were validated as measures of self-concept. Thus, it can be tenuously recommended that the Evaluation and Potency dimensions for males and the Evaluation, Activity, and "Intellectual Ability" dimensions for females be represented on an SD instrument used to measure self-concept. Although the convergent validity of the above dimensions was demonstrated, the tenuousness of the above recommen-

dation would be lessened if it were shown that these dimensions possess predictive and discriminant validity.

The above recommended dimensions certainly are not the only valid dimensions to be included on an SD instrument used to measure self-concept. The conclusions of this section therefore have the following limitations:

1. A dimension can emerge only if the sample of SD scales used in the study contains several scales measuring that dimension.
2. The convergent validity of a dimension can be demonstrated only if the self-concept instrument with which it is being correlated also measures that particular dimension of self-concept.

Discussion of Results and Conclusions Regarding the Extent to which the Social Desirability Factor Influenced the EPA Dimensions

Discussion. The discussion in this section is concerned with the extent to which the social desirability factor could influence the SD dimensions (EPA) when they are employed as measures of self-concept. Analyses of the data suggested that the Evaluation dimension when used as a measure of self-concept for females could be influenced by the social desirability factor. This finding is consistent with other research findings (Ford et al., 1965; Pervin et al., 1967) although previously this conclusion was not limited to females. For males it was found that the Potency dimension when used as a measure of self-concept could be influenced by the social desirability factor.

Once it was determined which dimensions may have been influenced by a social desirability factor, the question of the extent of this potential influence was ascertained. Ford and Meisels (1965) concluded from their results that the concepts of social desirability, as applied to personality questionnaire items, and evaluativeness, as applied to SD scales, were highly comparable, if not identical. Number one of the following two findings in this study does not support Ford and Meisels' conclusions:

1. When the effect of social desirability was statistically removed from the Evaluative factor and the set of criterion measures of self-concept for the sample of females, the multiple correlation between the Evaluative factor and the set of criterion measures of self-concept was significant.
2. When the effect of social desirability was statistically removed from the Potency factor and the set of criterion measures of self-concept for the sample of males, the multiple correlation between the Potency factor and the set of criterion measures of self-concept was significant.

Conclusions. The following conclusions can be drawn regarding the extent to which the social desirability factor influenced the EPA dimensions:

1. The Activity and "Intellectual Ability" dimensions when used as measures of self-concept were not influenced by a social desirability factor for the sample of females.
2. The Potency dimension failed to be validated as a measure of self-concept for the sample of females; thus, the extent to

which the social desirability factor influenced the Potency dimension for females was not investigated.

3. Analyses of the data suggested that the Evaluation dimension when used as a measure of self-concept for females could be influenced by the social desirability factor. The extent of this influence upon the Evaluation dimension was not of sufficient magnitude to render the Evaluation dimension an invalid measure of self-concept.
4. The Evaluation dimension when used as a measure of self-concept was not influenced by a social desirability factor for the sample of males.
5. The Activity dimension failed to emerge as a measure of self-concept for the sample of males; thus, the extent to which the social desirability factor influenced the Activity dimension for males was not investigated.
6. Analyses of the data suggested that the Potency dimension when used as a measure of self-concept for males could be influenced by the social desirability factor. The extent of this influence upon the Potency dimension was not of sufficient magnitude to render the Potency dimension an invalid measure of self-concept.

Recommendations. At present the theoretical relationship between social desirability and self-concept is not clear. Consequently, until this relationship is understood, the investigator will view the social desirability factor as a confounding influence in the interpretation of the

measurement of self-concept through the SD technique. Based upon the above position the following recommendations are made:

1. When using the Evaluation dimension as a measure of self-concept for females, one should be aware of the possible confounding influence of the social desirability factor.
2. When using the Potency dimension as a measure of self-concept for males, one should be aware of the possible confounding influence of the social desirability factor.

Discussion of Results and Conclusions Regarding the Development of an SD Instrument to Measure Self-Concept

Discussion. The overall orientation of the present study was the development of an SD instrument to measure self-concept containing scales selected through factor analytic techniques on which factor scores could be computed without resorting to a complicated differential weighting procedure. Several researchers have indicated that the existence or possible existence of concept-scale interaction, whether it is a function of relevance or stimulus environment, means that an SD should be validated and adjusted for every new stimulus class with which it is used. A generalized SD, using the standard EPA scales previously classified by Osgood, can be used as a rough measurement, but more precise measurements will be attained only by tailoring instruments to each concept domain so as to control for concept-scale interaction.

The development of the SD instrument containing specially selected scales was based upon the conclusions derived from several preliminary investigations conducted in this study. The preliminary investigations were

concerned with the specific purposes discussed above in the introduction on page 75. The conclusions to these preliminary investigations have been stated previously in this chapter, and the discussion of the results and conclusions of this section will reflect the implementation of these conclusions into the development of the SD instrument.

For males the Evaluation and Potency dimensions were employed as measures of self-concept on the refined SD instrument. For females the Evaluation, Activity, and "Intellectual Ability" dimensions were employed as measures of self-concept on the refined SD instrument. Appendix B contains the defining scales for each of the dimensions. The defining scales for each dimension were chosen so that they did not correlate with social desirability and so that they correlated significantly only with one dimension. The latter requirement was implemented in an effort to obtain independent measures of self-concept since orthogonality of dimensions was not an inherent property of the method utilized to obtain unweighted factor scores. For both males and females none of the dimensions correlated significantly with a measure of social desirability. However, for males the Evaluation dimension and the Potency dimension were not independent. Also for females the Evaluation and "Intellectual Ability" dimensions were not independent.

The Evaluative and Potency factors for males and the Evaluative and "Intellectual Ability" factors for females each had a significant multiple correlation with the set of criterion measures of self-concept. However, the Activity factor for females did not correlate significantly with the set of criterion measures of self-concept. Previously, it was determined that the Activity dimension could be used as a valid measure of

self-concept for females. This discrepancy in results can be linked to the changing of the basic characteristics of the factor caused by: (1) the changing from a differentially weighted method of obtaining factor scores to an unweighted method and (2) the elimination of factor defining scales caused by the scale selection criteria.

Conclusions. The following conclusions can be drawn regarding the development of an SD instrument to measure self-concept:

1. Semantic differential scales were isolated for the Evaluation and Potency dimensions for males and the Evaluation and "Intellectual Ability" dimensions for females which render the dimensions to be valid (convergent) measures of self-concept and unrelated to social desirability.
2. The Activity dimension was shown in this study to be a valid measure of self-concept for females when the factor scores were obtained through a differentially weighted method, but the investigator was unable to isolate scales from among those studied to represent the Activity dimension on an SD instrument that would validly measure self-concept when the factor scores were obtained through an unweighted method.
3. The total score on the refined SD instrument was shown for both males and females to be a valid (convergent) measure of self-concept.
4. The internal consistency reliability coefficients of the Evaluative (.784) and Potency (.474) dimensions for males and the Evaluative (.678) and "Intellectual Ability" (.648) dimensions for females were only of moderate magnitude. Future investi-

gations of this initial SD instrument should attempt to increase the magnitude of the internal consistency reliability of each of the dimensions to a more acceptable level.

Recommendations. The SD instrument developed in this study to measure self-concept is in its initial stage of development. The investigator does not recommend its use as a measure of self-concept until the following tasks are completed:

1. The internal consistency reliability of the dimensions represented on the instrument is increased.
2. The independence of the dimensions represented on the instrument is attained.
3. The identification is made of SD scales to represent the Activity dimension that would validly measure self-concept for females.
4. An investigation of the SD instrument's predictive validity, discriminant validity, and test-retest reliability.

Summary of Conclusions

The underlying factor structure of self-concept as measured by the SD technique was found to be different for males and females. An alpha factor analysis of the subjects' responses on fifty-three SD scales to the concept "ME AS I REALLY AM" produced five interpretable factors for the male subjects and five interpretable factors for the female subjects. The males' factor structure consisted of the following factors: Evaluative, Potency, "Mood," "Aspired-Self," and "Physical Size." The females' factor structure consisted of the following five factors: Evaluative,

"Aspired-Self," Potency, Activity, and "Intellectual Ability." A subsequent investigation of the convergent validity of the above factors resulted in the confirmation of only the Evaluative and Potency factors for males and the Evaluative, Activity, and "Intellectual Ability" factors for females as valid measures of self-concept.

An investigation of the extent to which the social desirability factor influenced the measurement of self-concept with the above factors was undertaken. The results of this investigation suggested that the Evaluation dimension for females and the Potency dimension for males when used as a measure of self-concept could be influenced by the social desirability factor. However, the extent of this influence upon each of these dimensions was not of sufficient magnitude to render them invalid measures of self-concept.

The overall orientation of the present study was the development of an SD instrument to measure self-concept containing scales selected through factor analytic techniques on which factor scores could be computed without resorting to a complicated differential weighting procedure. The development of the SD instrument incorporated the conclusions derived from the preliminary investigations conducted in this study. SD scales were isolated for the Evaluation and Potency dimensions for males and the Evaluation and "Intellectual Ability" dimensions for females which rendered the dimensions valid measures of self-concept and unrelated to social desirability. The Activity dimension was shown to be a valid measure of self-concept for females when the factor scores were obtained through a differentially weighted method, but the investigator was unable to isolate scales from among those studied to represent the Activity dimension

on an SD instrument that would validly measure self-concept when the factor scores were obtained through an unweighted method.

The SD instrument developed in this study to measure self-concept should be considered to be in its initial stage of development and is not recommended for use as a measure of self-concept until several tasks previously outlined are completed.

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APPENDIX A

FIFTY-THREE SEMANTIC DIFFERENTIAL SCALES

kind-cruel

motivated-aimless

strong-weak

calm-excitable

heavy-light

eager-indifferent

participant-non-participant

large-small

complex-simple

friendly-unfriendly

relaxed-tense

likeable-unlikeable

hard-soft

affectionate-hostile

intelligent-unintelligent

leader-follower

free-constrained

clean-dirty

serious-humorous

severe-lenient

rugged-delicate

interesting-boring

important-unimportant

opaque-transparent

reserved-talkative

active-passive

independent-dependent

useful-useless

tough-fragile

wise-foolish

bold-timid

happy-sad

sociable-unsociable

sharp-dull

superior-inferior

honest-dishonest

energetic-lethargic

fresh-stale

competent-incompetent

rash-cautious

deep-shallow

enjoyable-unenjoyable

masculine-feminine

unselfish-selfish

good-bad

sensitive-insensitive

fast-slow

sweet-bitter

hot-cold

nice-awful

big-little

powerful-powerless

quiet-noisy

APPENDIX B

SUGGESTED DIMENSIONS AND DEFINING SEMANTIC DIFFERENTIAL SCALES FOR THE REFINED SEMANTIC DIFFERENTIAL INSTRUMENT

DIMENSIONS AND DEFINING SEMANTIC DIFFERENTIAL SCALES

Evaluative

kind-cruel (male)

participant-non-participant (male & female)

friendly-unfriendly (male)

relaxed-tense (male & female)

affectionate-hostile (male)

intelligent-unintelligent (male)

leader-follower (male)

severe-lenient (male)

interesting-boring (male)

sharp-dull (male)

superior-inferior (male)

sensitive-insensitive (male)

sweet-bitter (male)

nice-awful (male & female)

motivated-aimless (female)

calm-excitable (female)

eager-indifferent (female)

likeable-unlikeable (female)

happy-sad (female)

sociable-unsociable (female)

powerful-powerless (female)

Potency (males only)

strong-weak

free-constrained

fast-slow

Intellectual Ability (females only)

intelligent-unintelligent

wise-foolish

honest-dishonest

competent-incompetent